Research Report

LJ EADS, RYAN CLARKE, XIAOXU SEAN LIN

AUGUST 2023

# Guardians of the Invisible Arsenal

## Unveiling the CCP's Weapons Research at the Research Institute of Chemical Defense

**Table of Contents**


**Executive Summary | Page 3**

**Weapons Research at the Research Institute of Chemical Defense of the PLA's Academy of Military Sciences | Pages 4-5**

**Advancements in Chemical Warfare | Page 5**

**Biochemical Defense and Biotechnology | Pages 5-6**

**Nanotechnology and Materials Science | Pages 6-7**

**The Brown-Edged Moth's Venomous Defense Mechanism and the CCP's Chemical Weapons Development | Page 8**

**High-Efficiency Damage Technology and the Development of Dual-Mode Warheads: Ethical Implications | Pages 9-10**

**Illicit Stockpiling and Weaponization of Mustard Gas for PLA Chemical Defense | Pages 11-13**

**Potential Risks and Ethical Concerns | Pages 13-14**

**International Regulations and Diplomacy | Pages 14-15**

**Conclusion | Pages 15-16**

**Annex A: Open-Source Research Produced by the Research Institute of Chemical Defense (军事科学院防化研究院) | Pages 17-39**

**Annex B: Closed-Source Research Produced by the Research Institute of Chemical Defense (军事科学院防化研究院) | Pages 39-50**

**Annex C: Data-driven Defense Against China's Adversarial Intentions | Page 51**

## Executive Summary

1. The Research Institute of Chemical Defense is a pivotal institution in China's defense strategy, conducting innovative military research on chemical and biochemical materials for military applications.

2. Advancements in chemical warfare agents focus on developing toxic compounds with high lethality, efficient dissemination methods, and resistance to countermeasures, while prioritizing safety for friendly forces.

3. The potential misuse of nanotechnology for chemical or biochemical warfare raises ethical and legal concerns, including nano-enhanced delivery systems and stealthy dispersal methods for toxic substances. This research leads to the development of more harmful chemical or biological agents. The concept of "invisible arsenals," where advancements in these emerging technologies enable the development of covert and undetectable weapons, calls for a broader discussion on the evolving definition of what constitutes a chemical weapon.

4. The paper on the bristle structure and stinging mechanism of the larvae of the brown-edged moth has potential implications for the development of chemical weapons. The larvae of this moth possess spines and bristles containing toxins that can cause adverse reactions in humans upon contact. The researchers are also involved in the development of chemical warfare agents and advanced warhead technologies in other areas of their research.

5. The paper on dual-mode warheads emphasizes high-efficiency damage technology and optimizing military technology, underlining the importance of using such advancements for legitimate purposes. Dual-mode warheads have the potential for misuse if modified to disperse chemical or biological agents, targeting specific individuals, or overcoming defensive measures.

6. Concerns have arisen over the Research Institute of Chemical Defense's potential illicit stockpiling and weaponization of mustard gas for PLA chemical defense, violating international norms and treaties and potentially destabilizing regional security. Addressing transparency and trust is essential to prevent unauthorized use and accidents.

7. The use of high-explosive weapons for chemical or biological warfare is illegal under international law, and strict controls and oversight are necessary to prevent harmful misuse.

8. Holding the Chinese Communist Party accountable to international norms and agreements is crucial in ensuring that the advancements in chemical, biochemical, and nanotechnological research conducted at the Research Institute of Chemical Defense are strictly used for legitimate military purposes and not for unethical or illegal activities, such as chemical or biochemical warfare. International cooperation and oversight are essential to prevent the misuse of scientific research and technologies for harmful purposes and to maintain global security and stability.

**Weapons Research at the Research Institute of Chemical Defense of the PLA's Academy of Military Sciences**

The Research Institute of Chemical Defense (军事科学院防化研究院) stands as a cornerstone of China's defense strategy, focusing on innovative military research in the field of chemical and biochemical materials. The institute, under the auspices of the Academy of Military Sciences, focuses on conducting cutting-edge research and development in the realm of chemical and biochemical materials for military applications. With an extensive array of expertise and resources at its disposal, the institute plays a critical role in bolstering China's defense readiness in an ever-changing global security landscape. The Research Institute of Chemical Defense of the Academy of Military Sciences is in Yangfang Town, Changping District, Beijing. The Research Institute of Chemical Defense has its own laboratories to include the State Key Laboratory of National Nuclear, Biological and Chemical Disaster Protection, the Beijing Key Laboratory of Advanced Chemical Power Storage Technology and Materials, the Beijing Nuclear and Chemical Safety Engineering Technology Research Center, the National Military Environmental Science Research Center, National Civil Air Defense Engineering Chemical Defense Research and Test Center, Chemical Defense Equipment Evaluation and Test Center, Military Battery Test and Testing Center and other scientific research and innovation platforms with supporting systems, advanced facilities, and military-civilian integration. [1] [2]

*Research Institute of Chemical Defense Facilities in Beijing Source: http://www.sciencehr.net/uploads/fhyjy/*

In this research report, we delve into the crucial military research conducted at the institute, shedding light on its cutting-edge advancements, potential applications, and the associated risks.

The institute conducts research in these key areas:

- Chemical Warfare Agents: Developing and studying various chemical compounds and agents that could be used for defensive or offensive purposes in warfare. This may include research on toxicity, decontamination methods, and safety protocols.

*Chemical Test From a 2019 Civilian Recruitment Announcement from the Institute Source: https://www.gaoxiaojob.com/zhaopin/zhuanti/jskxyfhyjy2019/index.html*

---

[1] In 2020, the Institute of Chemical Defense of the Academy of Military Sciences publicly recruits civilian personnel for the post plan, http://www.sciencehr.net/uploads/fhyjy/

[2] Chinese Wikipedia, 中国人民解放军军事科学院防化研究, https://zh.wikipedia.org/wiki/%E4%B8%AD%E5%9B%BD%E4%BA%BA%E6%B0%91%E8%A7%A3%E6%94%BE%E5%86%9B%E5%86%9B%E4%BA%8B%E7%A7%91%E5%AD%A6%E9%99%A2%E9%98%B2%E5%8C%96%E7%A0%94%E7%A9%B6%E9%99%A2

- Biochemical Defense: Researching ways to protect military personnel and civilians from biological threats, including studying pathogens, viruses, toxins, and developing countermeasures such as vaccines and antiviral drugs.
- Nanotechnology and Materials Science: Exploring nanomaterials with potential military applications, such as enhancing conventional weaponry, improving protective gear, and integrating advanced materials into military uniforms.
- Military Technology Optimization: Optimizing military technology, including warhead structures and high-efficiency damage technology, to enhance the performance and effectiveness of military equipment and weapons.[3]

The concept of "invisible arsenals," where advancements in nanotechnology and other cutting-edge fields enable the development of covert and undetectable weapons, calls for a broader discussion on the evolving definition of what constitutes a chemical weapon. Traditional frameworks may not fully encompass the novel threats posed by these emerging technologies, necessitating a reevaluation of the analytical calculus surrounding chemical warfare. To safeguard U.S. security effectively in the present and future, it is imperative to engage in wider deliberations on invisible weapons research, understand the potential risks and implications, and adapt regulatory and verification mechanisms to address the changing threat dynamics effectively. Such discussions can help fortify global non-proliferation efforts and maintain international security in the face of rapidly advancing and enigmatic weapons technologies.

## Advancements in Chemical Warfare[4]

The institute's primary mission revolves around developing advanced chemical warfare agents. These agents are intended to immobilize, incapacitate, or eliminate enemy forces swiftly and efficiently. The ongoing research explores novel chemical compounds and lethal agents with an emphasis on their toxicity, dissemination methods, and resistance to countermeasures. These agents are engineered to incapacitate or neutralize enemy forces swiftly and effectively. Researchers at the institute focus on understanding the chemical properties and behaviors of various toxic agents, exploring their potential applications in battlefield scenarios. This includes studies on the toxicity levels, persistence, dissemination methods, and decontamination strategies. One crucial aspect of this research is ensuring that these agents can be deployed safely by their own military forces while minimizing the risk of exposure to friendly personnel. This entails the development of specialized protective gear and decontamination protocols, as well as comprehensive training for military personnel.

## Biochemical Defense and Biotechnology[5]

Apart from chemical agents, the institute actively pursues research in biochemical defense, aiming to safeguard military personnel and the public from potential biological threats. This involves studying various pathogens, viruses, and toxins to understand their mechanisms better and develop targeted countermeasures such as vaccines and antiviral drugs. The goal is to develop vaccines, antiviral drugs, and other therapeutic solutions that can protect military

[3] Chemical Test From a 2019 Civilian Recruitment Announcement from the Institute, https://www.gaoxiaojob.com/zhaopin/zhuanti/jskxyfhyjy2019/index.html

[4] See Annex A & B for more in-depth research related to Research Institute of Chemical Defense

[5] See Annex A & B for more in-depth research related to Research Institute of Chemical Defense

personnel and the civilian population from biological attacks. The knowledge gained from this research not only strengthens China's military preparedness but also contributes to global health security by enhancing the world's capacity to respond to pandemics and infectious diseases.

## Nanotechnology and Materials Science[6]

The Research Institute of Chemical Defense also plays a crucial role in developing advanced nanomaterials with potential military applications. These nanomaterials can enhance the efficiency of traditional weaponry, improve protective gear for soldiers, and even be integrated into military uniforms to provide additional benefits like increased durability, enhanced camouflage, and real-time health monitoring.

Recognizing the potential of nanotechnology in revolutionizing defense capabilities, the Research Institute of Chemical Defense invests in nanomaterials research. Nanotechnology allows scientists to manipulate materials at the molecular or atomic level, leading to the development of advanced materials with unique properties and applications.

The emergence of dual-use nanotechnology in cutting-edge chemical warfare agents presents a multifaceted set of risks and implications that demand attention. Advances in quantum chemistry and biochemistry conducted clandestinely in university or corporate labs, ostensibly under the guise of benign 'health sciences' research, pose a significant risk due to the potential for developments in nanomaterials to be covertly repurposed for offensive military applications. These same advances in nanotechnology and materials science research conducted at facilities like The Research Institute of Chemical Defense could be diverted for malevolent purposes related to chemical or biochemical warfare.

The complex nature of nanotechnology, electronic properties, wave mechanics, and molecular design further complicates the task of determining genuine CWC compliance. The potential for these cutting-edge developments to be exploited covertly underscores the need for comprehensive monitoring and stringent verification measures. International organizations and regulatory bodies must remain vigilant and actively collaborate with scientific communities to ensure that research with dual-use potential is conducted transparently and responsibly. Nonetheless, it is essential to be aware of the potential risks associated with these research areas. Here are some potential ways this research could be misused:

- Nano-Enhanced Delivery Systems: Nanotechnology can be used to create sophisticated delivery systems for chemical or biological agents. Nanoparticles, nanocarriers, or nanoscale capsules could be designed to encapsulate and protect toxic substances, allowing for targeted delivery and enhanced penetration into biological systems, making the weapons more effective and dangerous.
- Stealthy Dispersal: Nanomaterials and nanodevices might enable the creation of stealthy and covert methods for dispersing chemical or biological agents. Nanoscale devices could be engineered to release the agents in a controlled manner, avoiding detection until the harmful effects are felt.

[6] See Annex A & B for more in-depth research related to Research Institute of Chemical Defense

- Improved Toxicity and Persistence: Nanomaterials can modify the chemical and biological agents' properties, increasing their toxicity and persistence in the environment, thus prolonging their detrimental effects and making decontamination more challenging.
- Resistant Protective Gear: Nanotechnology and Materials Science research could be exploited to develop protective gear for soldiers or operatives, designed to be resistant to standard protective measures or countermeasures used against chemical or biological weapons.
- Enhanced Surveillance and Targeting: Nanosensors and nanodevices might be developed to improve surveillance capabilities, allowing for more accurate identification, and targeting of specific individuals or groups based on biological markers or other characteristics.
- Nanomaterial-based Biological Agents: Nanotechnology could potentially be used to enhance the properties of biological agents, such as viruses or bacteria, making them more virulent, drug-resistant, or stable under various environmental conditions.
- Nanotoxicology: Research in nanotoxicology, which studies the potential adverse effects of nanomaterials on human health and the environment, might be misused to design more harmful chemical or biological agents.

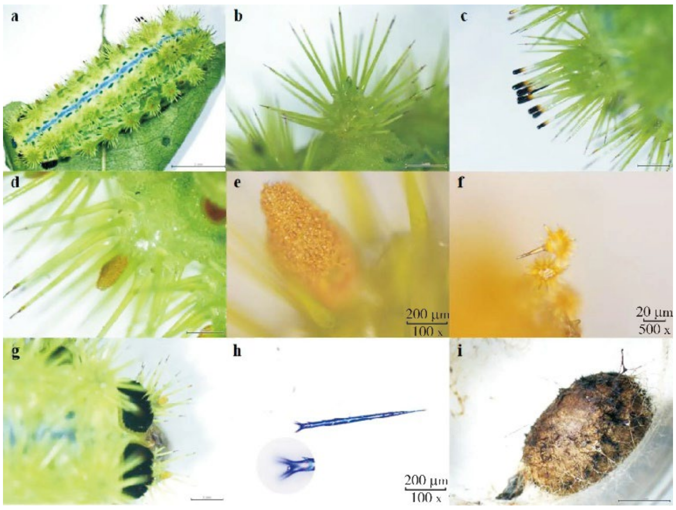
The development and deployment of nanosensors and nanodevices could greatly enhance the PLA's "Three Warfares" strategy. By leveraging these technologies, China can achieve its end goals through improved nano-enhanced surveillance and targeting capabilities, allowing for more effective psychological warfare, media warfare, and legal warfare. The CCP's NeuroStrike program becomes a crucial component in this strategy, enabling the unification of military and civilian thinking, weakening adversaries, and organizing legal offensives to gain control of public opinion and popular will.[7]

---

[7] RYAN CLARKE, XIAOXU SEAN LIN, LJ EADS, Enumerating, Targeting and Collapsing the Chinese Communist Party's NeuroStrike Program - Aggregating Intelligence Fragments and the Power of Network Graphs, The CCP BioThreats Initiative, 2023-07-01

## The Brown-Edged Moth's Venomous Defense Mechanism and the CCP’s Chemical Weapons Development

The institutes research titled “Preliminary study on the bristle structure and stinging mechanism of the larvae of the brown-edged moth” (褐边绿刺蛾幼虫刺毛结构及蛰伤机制初探) conducted on the bristle structure and stinging mechanism of the larvae of the brown-edged moth in the study has potential implications for creating chemical weapons. The larvae of the brown-edged moth are known to possess spines and bristles containing toxins that can cause adverse reactions in humans upon contact. The study aimed to understand the defense strategies of these larvae and analyzed the composition of the venom in the modified setae and body spines.




*Larva and urticating hairs of Parasa consocia Note: a, Larva and urticating hairs of Parasa consocia; b, body spines; c, club-shaped spines; d and e, orange-yellow spines ; f, microsphere spines; g, black seta cluster; h, modified seta and its base; i, cocoon. Note: a, Larva; b, Spines; c, Rod-like spines; d and e, Orange hairs; f, Microspheric setae; g, Black modified setae; h, Modified seta and base of modified seta; i, Cocoon.*
*Source: “Preliminary study on the bristle structure and stinging mechanism of the larvae of the brown-edged moth”*

The study revealed that the larvae have four types of bristles, including ordinary body spines, open rod-shaped spines, modified setae, and microsphere spines. These different types of bristles work synergistically to deliver venom to their victims. The venom was found to contain proteins and peptides, which are known to induce pain and allergic reactions in mice.

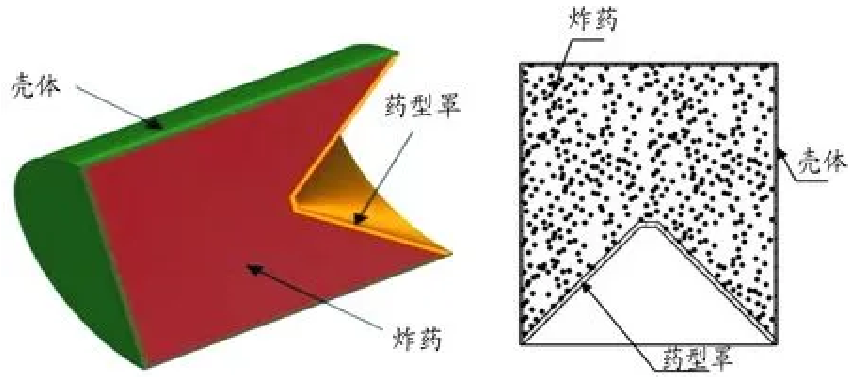
Such research on venomous bristles could have potential implications for developing chemical weapons. The toxins found in these bristles have the potential to cause harm to humans and could be weaponized for harmful purposes. Understanding the chemical composition and stinging mechanism of these toxins could be misused for developing toxic agents for warfare or terrorist activities. Therefore, the research findings raise ethical concerns and underscore the need for strict regulations and oversight on the use of scientific research for harmful purposes.

In addition to studying the bristle structure and stinging mechanism of the brown-edged moth, these same PLA researchers at the Institute of Chemical Defense are also involved in the development of chemical warfare agents and advanced warhead technologies in other areas of their research.[8]

[8] Yang Lele, Duan Chenyuan, Li Jing, Meng Fanhua, Cao Ying, Dai Xiandong, Zhang Aibing, Fan Chongxu, Preliminary study on the bristle structure and stinging mechanism of the larvae of the brown-edged moth” (褐边绿刺蛾幼虫刺毛结构及蛰伤机制初探), Journal of Environmental Entomology, Issue 1, 2022, 2022-03-24

**High-Efficiency Damage Technology and the Development of Dual-Mode Warheads: Legal and Ethical Implications**

The paper titled "Numerical simulation research on dual-mode warhead structure optimization" (双模战斗部结构优化数值模拟研究_参考) discusses high-efficiency damage technology, particularly focusing on the development of dual-mode warheads, which are considered innovative and forward-looking in military technology. Dual-mode warheads use intelligent sensors to select the best detonation method (e.g., shaped charge) at the right time to cause optimal damage to the target. The paper reviews previous research on multi-mode warheads and aims to further study the conversion between rod-type penetrating bodies and explosively formed projectiles (EFPs).




*3D and 2D schematic diagrams of the dual-mode warhead molding charge structure*
*Source: "Numerical simulation research on dual-mode warhead structure optimization"*

The researchers use numerical simulations and finite element software (ANSYS/AUTODYN) to analyze the formation process of damage elements (JET and JPC) under different detonation conditions and structural parameters of the warhead. They study factors like cone angle, diameter of the truncated cone, and initiation position to optimize the warhead structure. Through orthogonal optimization, they determine the best combination of parameters for achieving dual-mode conversion of JET and JPC.

The paper suggests that optimizing the warhead structure can enhance the performance and efficiency of high-explosive weapons. However, it is essential to emphasize that advancements in high-efficiency damage technology should be used for legitimate and lawful purposes and not for chemical or biochemical warfare, which is illegal under international law and treaties. The focus of this research seems to be on improving military technology rather than facilitating chemical or biochemical warfare.[9]

While the research paper primarily focuses on high-efficiency damage technology and the development of dual-mode warheads for legitimate military applications, it's essential to recognize that this technology could potentially be misused or extended for chemical or biochemical warfare. Here's how such research could be potentially misused:

- Incorporating Chemical or Biological Agents: Dual-mode warheads could be modified to carry and disperse chemical or biological agents instead of conventional explosives. The intelligent sensor components could be programmed to release the toxic substances at the right time and under specific conditions to maximize their impact on the target.

[9] Xu Guangze, Zhang Liang, Zhang Xinggao, Lu Wei, Li Xiaojun, Fang Guofeng, Numerical simulation research on dual-mode warhead structure optimization" (双模战斗部结构优化数值模拟研究_参考), Journal of Ordnance Equipment Engineering, Issue 2, 2021, 2021-03-05

- Enhancing Target Specificity: By integrating advanced sensors and AI algorithms, these warheads could be designed to target specific individuals, groups, or geographic locations based on their unique biological characteristics or genetic markers, thus increasing the precision of the attack.
- Increased Lethality: The optimization of warhead design could lead to greater lethality and damage to biological structures within the target area, making it more effective for delivering chemical or biological agents and causing widespread harm.
- Overcoming Defenses: The research on multi-mode warheads could help design weapons that can bypass or neutralize existing countermeasures and protective measures against chemical or biological attacks, enhancing the effectiveness of such weapons.
- Concealment and Disguise: Dual-mode warheads could be designed to appear as conventional munitions to evade detection during transportation or deployment, allowing perpetrators to surprise their targets and inflict substantial damage before their true nature is revealed.

In addition to the prohibitions on the development, production, acquisition, stockpiling, and use of chemical and biological weapons under the Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC), the CWC also includes provisions for verification and inspections. States Parties to the CWC agreed to establish a verification regime to ensure that certain toxic chemicals and their precursors listed in Schedules 1, 2, and 3 of the Annex on Chemicals are only used for legitimate purposes not prohibited under the treaty.

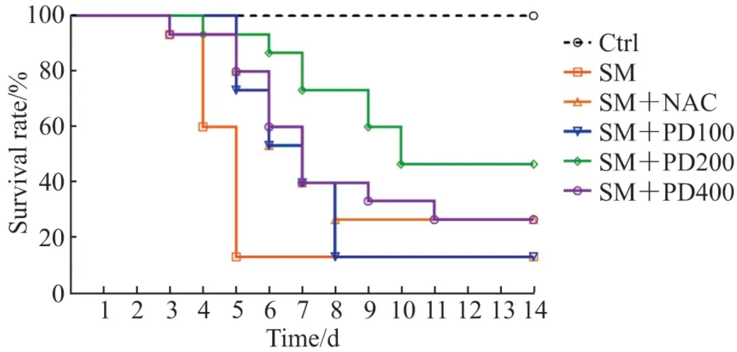
The CWC further incorporates a 'challenge inspection' procedure, which allows any State Party to request a surprise inspection if they have doubts about another State Party's compliance with the treaty. The 'challenge inspection' principle emphasizes 'any time, anywhere' inspections, leaving no room for refusal by the inspected State Party. These measures are crucial in enforcing compliance and deterring the illegal production, stockpiling, or use of chemical weapons, and they underscore the global commitment to preventing the misuse of toxic chemicals and ensuring international security. It is essential to respect and uphold these provisions to maintain a world free from the threat of chemical and biological warfare.[10] [11]

[10] The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (the Chemical Weapons Convention or CWC), Effective 1997-04-29, https://www.opcw.org/chemical-weapons-convention

[11] Biological Weapons Convention, Effective 1975-03-26, https://disarmament.unoda.org/biological-weapons/

**Illicit Stockpiling and Weaponization of Mustard Gas for PLA Chemical Defense[12]**

The research on the protective effect of polydatin (PD) on mustard gas (sulfur mustard, SM) lung injury in mice suggests that PD can improve the survival rate and reduce lung injury caused by SM exposure. SM is a highly toxic chemical warfare agent with no specific treatment, making it a significant military threat. The main target organ of SM injury is the lung, leading to acute lung injury and even death. Oxidative stress is a critical factor in SM poisoning, and inflammatory factors play a crucial role in lung injury caused by SM.



*Effect of PD on survival rate of SM-exposed mice*

Polydatin, a glycoside derivative of resveratrol, has been shown to possess antioxidant and anti-inflammatory properties and can protect kidney, liver, and lung functions. The study aimed to explore the effect of PD on SM lung injury and its underlying mechanism. The researchers used male ICR mice to establish an SM lung injury model and administered PD orally for several days after SM exposure. The results showed that PD treatment increased the survival rate of SM-infected mice, reduced the lung wet weight/dry weight ratio, and decreased the protein concentration in bronchoalveolar lavage fluid (BALF), indicating a protective effect on pulmonary edema and lung injury. PD also reduced oxidative stress-related indicators such as malondialdehyde (MDA) content, hydrogen peroxide (H2O2) content, and myeloperoxidase (MPO) activity while increasing glutathione (GSH) content and superoxide dismutase (SOD) activity, suggesting antioxidant effects.

Furthermore, PD up-regulated the expression of SIRT1 protein, promoted the nuclear transfer of Nrf2 (a key molecule in antioxidant response), and up-regulated the expression of antioxidant proteins HO-1 and NQO1, indicating its involvement in the regulation of antioxidant pathways. PD treatment also reduced the levels of inflammatory factors, such as TNF-α, IL-1β, and IL-6, which are elevated in SM-induced lung injury. Additionally, PD suppressed the TLR4/NF-κB pathway, which is associated with inflammatory responses.

Overall, the study suggests that PD can potentially be used to mitigate the effects of SM lung injury by modulating oxidative stress and inflammatory responses, making it a promising candidate for further research and development of therapeutic drugs to counter the effects of chemical warfare agents.

The Department of Chemical Defense Medicine at Naval Medical University, under the auspices of the People's Liberation Army (PLA), has been actively engaged in cutting-edge research to develop therapeutic drugs aimed at countering the effects of chemical warfare

[12] Wang Yurun, Cen Jinfeng , Meng Wenqi , Pei Zhipeng , Sun Mingxue, Protective effect of polydatin on mustard gas lung injury in mice (虎杖苷对小鼠芥子气肺损伤的保护作用), Journal of the Second Military Medical University, Issue 4, 2022, 2022-11-18

agents. This initiative comes as a crucial component of China's preparedness to safeguard its military personnel and civilian population in the event of chemical warfare agent exposure.

While the Research Institute of Chemical Defense’s mission ostensibly revolves around defensive measures and protection against chemical threats, there have been growing concerns regarding the possibility of illicit stockpiling and weaponization of mustard gas for potentially aggressive purposes.

- Violation of International Norms and Treaties: One of the primary concerns surrounding the Research Institute of Chemical Defense is its adherence to international norms and treaties related to the prohibition of chemical weapons. China is a signatory to the Chemical Weapons Convention (CWC), which unequivocally prohibits the development, production, stockpiling, and use of chemical weapons. If the Institute is found to be illicitly accumulating mustard gas beyond the stipulated defensive needs, it would raise serious questions about China's commitment to upholding its obligations under the CWC and adherence to global disarmament efforts.

- Potential Aggressive Use: Mustard gas, also known as sulfur mustard, is a potent chemical warfare agent that inflicts severe injuries on exposed individuals, causing excruciating pain and long-term health consequences. While the Institute may argue that its research on mustard gas is purely for defensive purposes and medical countermeasure development, the sheer volume of stockpiles and advancements in weaponization techniques may suggest otherwise. The accumulation of mustard gas beyond reasonable defensive needs raises concerns about potential offensive use, should the volatile political or military situation warrant such actions.

- Destabilization of Regional Security: The illicit stockpiling and weaponization of mustard gas by the Research Institute of Chemical Defense could have broader implications for regional security and stability. The possession of significant quantities of mustard gas by a major military power like China may trigger regional anxieties and escalate tensions with neighboring countries. Such actions may inadvertently lead to an arms race, further jeopardizing peace and security in the region.

- Increased Risk of Accidents and Unauthorized Use: A large-scale stockpile of mustard gas inherently increases the risk of accidents and unauthorized access. Mishandling or accidental release of the agent during storage or transportation could have catastrophic consequences, posing a threat to nearby civilian populations and the environment. Moreover, the potential for rogue elements or non-state actors to gain access to the stockpiles raises concerns about unauthorized use of the chemical agent for terrorist activities or proxy conflicts.

- Erosion of Trust and Transparency: The Research Institute of Chemical Defense, as an entity affiliated with the PLA, operates with a certain level of secrecy, which can lead to concerns about the lack of transparency in its activities. Failure to disclose accurate information about the quantities, intentions, and purposes of mustard gas stockpiling may erode trust among the international community and contribute to heightened suspicions regarding China's chemical defense program.

While the Research Institute of Chemical Defense plays a significant role in China's chemical defense preparedness, concerns about the illicit stockpiling and weaponization of mustard gas for potentially aggressive purposes cast a shadow over its stated defensive mission. Addressing these concerns requires China's unequivocal commitment to transparency, adherence to international treaties, and clear communication regarding the true nature and purpose of its mustard gas research and stockpiles. Ultimately, fostering trust and cooperation with the international community is essential to ensure collective efforts in preventing the illicit proliferation and use of chemical weapons.

## Potential Risks and Ethical Concerns

The military research conducted at the Research Institute of Chemical Defense raises several ethical concerns and potential risks that must be carefully addressed to uphold international norms and ensure global security. Some of these risks and ethical considerations include:

- Humanitarian Consequences: The development of highly toxic chemical agents intended for warfare poses significant humanitarian risks. These agents have the potential to cause devastating harm to both military personnel and civilian populations if used indiscriminately or improperly. Such actions could lead to widespread suffering, loss of life, and long-term health implications for affected communities.

- Environmental Impact: The use of chemical warfare agents can have severe environmental consequences. These agents can contaminate soil, water sources, and ecosystems, affecting not only human health but also plant and animal life. The long-lasting effects of such contamination can be detrimental to the environment and may require extensive and costly cleanup efforts.

- Non-Compliance with International Agreements: The Research Institute of Chemical Defense must adhere to international agreements and treaties that prohibit the use, development, production, and stockpiling of chemical and biological weapons. Any violations of these agreements could lead to diplomatic tensions and damage China's reputation in the international community.

- Risk of Accidents: The storage, handling, and transport of chemical warfare agents carry inherent risks. Accidental leakage or release of these agents could result in unintended exposure, endangering the lives of individuals and communities nearby. Adequate safety protocols, storage facilities, and risk assessment measures must be in place to prevent such incidents.

- Proliferation and Unauthorized Acquisition: The potential for the unauthorized acquisition or proliferation of chemical and biological weapons must be addressed. Ensuring the strict control and safeguarding of these materials is crucial to prevent their misuse by non-state actors or rogue elements.

- Dual-Use Technology: Nanotechnology and Materials Science research, while offering promising advancements, also possess dual-use capabilities. The same technologies that enhance military equipment and protective gear could be misused to develop more potent and harmful weapons.

- Responsibility in Research: Ethical considerations in scientific research are paramount. Researchers must take responsibility for the potential implications of their work and ensure that their findings are used responsibly and ethically. The focus should be on legitimate military applications that adhere to international laws and treaties.

- Transparency and Accountability: The Research Institute of Chemical Defense should demonstrate transparency in its research activities and be held accountable for any potential violations of international agreements. Open communication and cooperation with the international community can help build trust and prevent misunderstandings.

- International Cooperation and Oversight: Collaboration between nations and international organizations is vital to monitor and regulate the development and use of chemical and biological materials for military purposes. A collective effort is necessary to prevent the proliferation and misuse of such technologies.

- Commitment to Disarmament: It is essential for the Chinese Communist Party and all nations to reaffirm their commitment to disarmament efforts and nonproliferation initiatives. By actively participating in global disarmament efforts, countries can contribute to a safer and more stable world.

In conclusion, the military research conducted at the Research Institute of Chemical Defense requires responsible and ethical practices to mitigate potential risks and ensure adherence to international norms and agreements. The development and use of chemical and biological weapons have severe humanitarian consequences and environmental impacts, making it imperative to uphold international laws and treaties prohibiting their use. Holding the Chinese Communist Party accountable and promoting international cooperation and oversight are crucial steps in preventing the misuse of scientific research for unethical or illegal activities and maintaining global security and stability. [13]

## International Regulations and Diplomacy

The Research Institute of Chemical Defense is obligated to adhere to international arms control and non-proliferation agreements to mitigate the ethical concerns and risks associated with military research. As a signatory to the Chemical Weapons Convention (CWC), China is committed to using chemistry for peaceful purposes and eliminating chemical weapons. The institute must ensure that its advancements in chemical, biochemical, and nanotechnological

[13] Hartmut Frank, Jonathan E. Forman, David Cole-Hamilton, Chemical weapons: what is the purpose? The Hague Ethical Guidelines, Toxicological & Environmental Chemistry, Volume 100, 2018 - Issue 1, 2018-03-12

research are exclusively used for legitimate military applications and not for chemical or biochemical warfare. Compliance with international regulations, transparency in research activities, and diplomatic engagement are essential to promote peaceful resolutions and prevent the misuse of scientific research for harmful purposes. By upholding these principles, China can contribute to global security and stability, fostering cooperation and trust among nations.[14]

To ensure accountability for unethical and risky research, it is imperative that the Chinese Communist Party establishes robust internal oversight mechanisms and promotes a culture of transparency and adherence to international norms. Additionally, international scrutiny and peer-review processes can play a crucial role in holding the party accountable and verifying the institute's compliance with international regulations.

## Conclusion

In conclusion, the Research Institute of Chemical Defense, operating under the Academy of Military Sciences, plays a significant role in China's defense strategy by conducting cutting-edge military research on chemical and biochemical materials. The advancements in chemical warfare agents focus on developing highly lethal compounds with efficient dissemination methods, while ensuring the safety of friendly forces. Simultaneously, research on biochemical defense aims to protect both military personnel and civilians from potential biological threats, contributing not only to China's military preparedness but also to global health security.

The concept of "invisible arsenals," where advancements in nanotechnology and other cutting-edge fields enable the development of covert and undetectable weapons, calls for a broader discussion on the evolving definition of what constitutes a chemical weapon. Traditional frameworks may not fully encompass the novel threats posed by these emerging technologies, necessitating a reevaluation of the analytical calculus surrounding chemical warfare. To safeguard U.S. security effectively in the present and future, it is imperative to engage in wider deliberations on invisible weapons research, understand the potential risks and implications, and adapt regulatory and verification mechanisms to address the changing threat dynamics effectively. Such discussions can help fortify global non-proliferation efforts and maintain international security in the face of rapidly advancing and enigmatic weapons technologies.

The research on the brown-edged moth's venomous defense mechanism underscores the need for heightened vigilance in scientific research to prevent the potential misuse of such findings for the development of chemical weapons. These PLA researchers are also involved in the development of chemical warfare agents and advanced warhead technologies in other areas of their research, highlighting the importance of holding the Chinese Communist Party accountable on the misuse of scientific advancements for harmful purposes.

Moreover, the research paper on dual-mode warheads emphasizes the importance of using high-efficiency damage technology for legitimate military purposes. Nevertheless, there

---

[14] Organisation for the Prohibition of Chemical Weapons Member States, China Entry 29 April 1997, https://www.opcw.org/about-us/member-states/china

exists the possibility of misuse if these warheads were modified to disperse chemical or biological agents, target specific individuals, or overcome defensive measures. Such applications are illegal under international law, and it is imperative to implement strict controls and oversight.

The research on mustard gas sheds light on the alarming concerns surrounding the Research Institute of Chemical Defense's activities, including the potential illicit stockpiling and weaponization of mustard gas for PLA chemical defense. These findings emphasize the urgent need for international scrutiny, transparency, and strict compliance with existing chemical weapons conventions to prevent any misuse or accidental release of these dangerous agents.

Considering these risks, holding the Chinese Communist Party accountable to international norms and agreements is of utmost importance. By adhering to these norms, it ensures that the advancements in chemical, biochemical, and nanotechnological research are solely directed towards legitimate military purposes, safeguarding global security and stability. International cooperation and oversight will be instrumental in preventing any unethical or illegal misuse of these scientific research and technologies.

The Research Institute of Chemical Defense's research holds the potential to bolster China's defense capabilities and contribute to global health security. However, it is crucial for responsible research and ethical considerations to be prioritized to prevent the misuse of these advancements and to uphold international agreements on disarmament and nonproliferation. Through accountability, cooperation, and responsible practices, the institute's research can continue to advance military technology while abiding by international laws and promoting global security.

**Annex A: Open-Source Research Produced by the Research Institute of Chemical Defense (军事科学院防化研究院)**

1. Mar 26, 2023 @ 20:00:00.000 电池无损检测监测方法分析 燕山大学环境与化学工程学院, 军事科学院防化研究院 祝夏雨, 王静, 郝奕帆, 邱景义, 明海 北大核心;储能科学与技术 原位表征, 性能衍变, 电池, 预警, 无损检测

2. Mar 18, 2023 @ 20:00:00.000 氟利昂11在浸渍活性炭床层的吸脱附行为 北京化工大学化学工程学院, 军事科学院防化研究院国民核生化灾害防护国家重点实验室 郑超, 宋华, 白书培, 金君素, 康凯, 尹晓敏 北大核心;环境工程学报 机械泄露, 氟利昂11, 浸渍炭, 脱附, 吸附

3. Feb 5, 2023 @ 19:00:00.000 多频谱发烟组件结构设计与遮蔽性能 陆军工程大学石家庄校区, 63936部队, 军事科学院防化研究院 李笑楠, 陈浩, 郭爱强, 张开创, 高欣宝, 李天鹏 北大核心;兵工学报 多频谱干扰, 多频谱干扰剂, 石墨烯, 碳纤维, 碳纳米管, 发烟组件

4. Jan 30, 2023 @ 19:00:00.000 浅埋爆炸空气冲击波峰值压力计算方法研究 西安近代化学研究所, 军事科学院防化研究院 刘伟, 肖洋, 杨峰, 李尚青, 苏健军, 翟红波 北大核心;火工品 峰值压力, 比例埋深, 比例距离, 空气冲击波, 浅埋爆炸

5. Jan 30, 2023 @ 19:00:00.000 基于弱耦合资料同化的冬季北大西洋涛动年际变率预测 中国人民解放军军事科学院防化研究院, 清华大学地球系统科学系, 山东省气象服务中心 徐彩艳, 李斐斐 北大核心;气象学报 大气分量模式, 弱耦合资料同化, 海-气相互作用, 北大西洋涛动

6. Jan 30, 2023 @ 19:00:00.000 一维~1H同核选择性激发核磁共振方法在混合物分析中的应用 军事科学院防化研究院国民核生化灾害防护国家重点实验室, 西南

交通大学生命科学与工程学院 王栋, 袁铃, 黄桂兰, 黄帅, 夏俊美 北大核心;分析试验室 一维同核选择性激发, 无损检测, 混合物分析, 核磁共振

7. Jan 30, 2023 @ 19:00:00.000 掺杂石墨烯粉末的静电纺纳米纤维薄膜的制备 军事科学院防化研究院 童乾峰, 代晓东, 刘清海, 彭文联 CSCD;中国粉体技术 复合薄膜, 纳米纤维, 聚丙烯腈, 静电纺丝, 石墨烯

8. Jan 30, 2023 @ 19:00:00.000 基于绝对节点坐标方法的压发装置建模与优化 北京理工大学宇航学院, 军事科学院防化研究院, 淮南皖淮机电股份有限公司, 中物院高性能数值模拟软件中心, 北京应用物理与计算数学研究所 刘钺, 程万影, 胡德强, 水小平, 王斌, 马士洲 北大核心;北京理工大学学报 加载实验系统, 压发装置, 参数优化, 绝对节点坐标方法

9. Jan 12, 2023 @ 19:00:00.000 电阻式柔性触觉传感器的研究进展 重庆邮电大学自动化学院, 中国人民解放军军事科学院防化研究院 杨平安, 熊雨婷, 刘中邦, 李锐, 寿梦杰, 杨健健, 黄鑫, 屈正微 北大核心;材料导报 性能优化, 敏感材料, 柔性衬底, 结构设计, 电阻式柔性触觉传感器

10. Nov 16, 2022 @ 19:00:00.000 静电纺丝纳米纤维在吸波材料中的应用 北京科技大学能源与环境工程学院, 北京科技大学北京市工业典型污染物资源化处理重点实验室, 北京科技大学北京市高校节能与环保工程研究中心, 军事科学院防化研究院 郭圳, 徐爽, 李从举, 代晓东, 童乾峰 北大核心;精细化工 吸波材料, 氧化石墨烯, 电磁波, 纳米纤维, 金属氧化物, 静电纺丝

11. Mar 31, 2022 @ 20:00:00.000 航天发射可视化仿真分析技术与应用研究 Institute of Chemical Defence, 军事科学院防化研究院, Beijing Institute of Tracking and Communication Technology, 北京跟踪与通信技术研究所 Zhong Yan, Wang Jia, Li Sujiang, Liu Xiuluo, AMA, Wu Feng, PLA, Liu Yang //XTFZ.cbpt.cnki.net 3d visualization, digital experiment, simulation and evaluation, space launch informatization, virtual simulation

12. Jan 30, 2022 @ 19:00:00.000 储能电站可靠性与安全性技术研究进展 中华人民共和国应急管理部消防救援局, 中央军委后勤保障部军需能源技术服务中心, 河南省消防救援总队, 军事科学院防化研究院 于海青, 高维娜, 邱景义, 苏文威 北大核心;电池 储能电能, 储能系统, 可靠性, 安全性, 消防, 预警, 锂离子电池

13. Jan 30, 2022 @ 19:00:00.000 褶皱氧化石墨烯的制备与应用研究进展 北京化工大学材料科学与工程学院有机无机复合材料国家重点实验室材料电化学过程与技术北京市重点实验室, 军事科学院防化研究院国民核生化灾害防护国家重点实验室 朱彬彬, 徐斌, 李伟丽, 曾旭, 郑晓慧, 邱伟 北大核心;新型炭材料 ph值调控法, 快速干燥法, 溶剂诱导法, 预拉伸法, 褶皱氧化石墨烯

14. Jan 30, 2022 @ 19:00:00.000 氡防护体系动态介绍与评述 北京大学物理学院核物理与核技术国家重点实验室, 军事科学院防化研究院 郭秋菊, 张磊 北大核心;辐射防护 iaea, icrp, unscear, 剂量转换系数, 氡暴露

15. Jan 30, 2022 @ 19:00:00.000 某型车辆在高空核爆炸环境下的电磁脉冲耦合特性 军事科学院防化研究院, 陆军防化学院, 陆军装备部驻昆明军代表室 郑毅, 张雄, 刘欣, 赵玮, 李小强, 朱之贞, 聂坤林, 李鹏, 魏雍力, 诸雪征 北大核心;兵工学报 时域有限差分法, 耦合效应, 高空核爆炸, 电磁脉冲

16. Jan 30, 2022 @ 19:00:00.000 信号采样对Cs 哈尔滨工程大学核科学与技术学院, 军事科学院防化研究院国民核生化灾害防护国家重点实验室 周春芝, 朱红英, 张立功, 陈声强, 徐思, 吴坤, 席善学, 王尊刚, 刘辉兰, 李林祥, 王利斌, 宋玉收, 黄广伟 北大核心;哈尔滨工程大学学报 中子/γ甄别, 向量投影法, 极端梯度提升机, 电荷比较法, 聚类, 轻量级梯度提升机, 采样深度, 采样率, cs liycl:ce 探测器

17. Jan 30, 2022 @ 19:00:00.000 基于OpenFOAM的化学危害扩散预测求解器的开发与验证　　陆军防化学院, 军事科学院防化研究院, 陆军装备部项目管理中心　　顾进, 张赫, 左钦文, 张宏远, 韩朝帅, 诸雪征　　北大核心;兵工学报　　openfoam, 实验模拟, 扩散预测, 软件开发, 化学危害

18. Jan 30, 2022 @ 19:00:00.000 聚氨酯泡沫浸渍酚醛树脂溶液制备炭泡沫隔热材料研究　军事科学院防化研究院国民核生化灾害防护国家重点实验室, 国防科技大学空天科学学院　　王德刚, 王馨博, 苏茹月, 郑梓璇, 栗丽, 梁国杰, 李凯　　北大核心;材料导报　　压缩强度, 液相酚醛树脂, 线收缩率, 网状玻璃炭泡沫, 高温热导率, 聚氨酯泡沫

19. Jan 30, 2022 @ 19:00:00.000 子母式干扰弹战斗部结构设计与抛撒策略　　陆军工程大学石家庄校区, 军事科学院防化研究院　李笑楠, 陈浩, 高欣宝　　陆军工程大学学报　　内弹道, 子母弹, 战斗部, 抛撒, 干扰弹

20. Jan 30, 2022 @ 19:00:00.000 特种弹药的发展现状　　军事科学院防化研究院　　李剑斌, 张开创, 盖希强, 郝雪颖, 张兴高, 何金燕　北大核心;兵器装备工程学报　发烟弹, 燃烧弹, 诱饵弹, 防暴弹, 特种弹药

21. Jan 30, 2022 @ 19:00:00.000 基于福岛核事故监测数据的辐射剂量场重构方法研究　　军事科学院防化研究院　　陈林, 陈晓雷, 吴涢晖, 黄广伟, 徐瑶　　北大核心;辐射防护　　径向基函数, 监测数据, 福岛核事故, 空间插值, 辐射剂量场重构

22. Jan 30, 2022 @ 19:00:00.000 蒸发冷凝气溶胶多分散性对透过率测试的影响　华南理工大学轻工科学与工程学院, 军事科学院防化研究院国民核生化防护国家重点实验室, 山西新华防化装备研究院有限公司　　胡梦想, 康健, 韩万飞, 唐敏, 王德生, 王泠沄, 蒋立建, 梁云　北大核心;环境工程　多分散性, 相对误差, 蒸发冷凝, 透过率, 单分散气溶胶

23. Jan 30, 2022 @ 19:00:00.000 植物发供电技术的研究进展 北京工业大学材料与制造学部, 军事科学院防化研究院先进化学蓄电技术与材料北京市重点实验室, 天津大学材料科学与工程学院 曹高萍, 封伟, 谢林翰, 李万忠, 明海, 邱景义, 张倩倩 北大核心;储能科学与技术 光合作用, 微生物燃料电池, 植物发供电, 浓差电池, 绿色能源技术

24. Jan 30, 2022 @ 19:00:00.000 New Insight on Graphite Anode Degradation Induced by Li-Plating Research Institute of Chemical Defense, Beijing Advanced Innovation Center for Materials Genome Engineering, Institute of Advanced Materials and Technology, University of Science and Technology Beijing, State Key Laboratory of Automotive Safety and Energy, Tsinghua University, Institute of Nuclear and New Energy Technology, Tsinghua University Qiao Hu, Dongsheng Ren, Hao Zhang, Xiangming He, Li Wang, Xiayu Zhu, Songtong Zhang, Tengteng Shen, Yan Liu, Yongchuang Xiong, Jingyi Qiu, Long Chen EI;Energy ＆ Environmental Materials -

25. Jan 30, 2022 @ 19:00:00.000 一种液态干扰材料红外衰减特性实验研究 军事科学院防化研究院 陈亮, 张良, 罗俊潇, 方国峰, 史卫东 北大核心;火工品 红外衰减特性, 纳米颗粒, 超声空气雾化, 液态干扰材料

26. Jan 30, 2022 @ 19:00:00.000 误差系数对变分同化的质量影响研究 陆军防化学院, 军事科学院防化研究院, 武警四川总队机动第二支队 顾进, 李广峰, 马岩, 韩朝帅, 蒋金利, 诸雪征 计算机与数字工程 变分同化, 数值模拟, 误差系数

27. Jan 30, 2022 @ 19:00:00.000 圆柱形爆炸容器的内壁爆炸载荷 火箭军工程大学核工程学院, 陆军工程大学野战工程学院, 军事科学院防化研究院 刘建青, 刘欣, 蔡星会, 顾文彬, 王涛, 沈慧铭, 王振雄 北大核心;爆炸与冲击 内壁爆炸载荷, 峰值压力, 比冲量, 圆柱形爆炸容器

28. Jan 30, 2022 @ 19:00:00.000 子母式发烟弹全弹道建模与分析 军事科学院防化研究院, 陆军装备部驻北京地区军事代表局 陈浩, 李红欣, 张开创, 盖希强,

赵新, 杨洋　北大核心;兵器装备工程学报　弹道建模, 抛撒技术, 横向间隔, 目标函数法, 子母式发烟弹

29. Jan 30, 2022 @ 19:00:00.000 基于亲核活性机理合成具有优良高倍率性能的纳米 Li　Research Institute of Chemical Defense, School of Chemical Engineering Beijing University of Chemical Technology, Beijing Key Laboratory of Advanced Chemical Energy Storage Technology and Materials　张文峰, 曹高萍, 潘凤玲, 张婷婷, 明海, 向宇　EI;Journal of Central South University　li ti o , 亲核活性 , 高倍率负极, 氧化石墨

Nov 30, 2021 @ 19:00:00.000　无线传感网络关键技术及在环境监测中的应用　防化研究院, Research Institute of Chemical Defense　QIAO Zhi-hong, HU Yun-li, LI Zhi-jun, WANG Pu-hong　//ZDHJ.cbpt.cnki.net　environmental monitoring, sensor, wireless

30. Nov 30, 2021 @ 19:00:00.000　无线传感网络关键技术及在环境监测中的应用　防化研究院, Research Institute of Chemical Defense　QIAO Zhi-hong, HU Yun-li, LI Zhi-jun, WANG Pu-hong　//ZDHJ.cbpt.cnki.net　environmental monitoring, sensor, wireless

31. Aug 31, 2021 @ 20:00:00.000　基于神经网络逆模型的广义预测控制及应用　军事科学院防化研究院, Institute of Chemical Defense, Military Academy of Sciences　YU Meng, MENG Lei, ZOU Zhi-yun, ZHU Wen-chao　//JZDF.cbpt.cnki.net　carima model, de-lm algorithm, gpc, hammerstein model, ph neutralization process

32. Jun 30, 2021 @ 20:00:00.000 气相色谱-脉冲火焰光度法测定环境气体中的维埃克斯　军事科学院防化研究院　WANG Hongying, HAO Huanming, WANG Jiawei, ZHANG Wu, WANG Zhenxiong　//LHJH.cbpt.cnki.net　-

33. Jun 30, 2021 @ 20:00:00.000 未爆弹药安全燃烧模型建立分析与应用　Army Engineering University, 陆军工程大学石家庄校区, Academy of Military Sciences of PLA, 军事科学院防化研究院, Chemical Defense Institute of China　Zhen

Jianwei, Jia Shuanzhu, Shijiazhuang Campus, Sun Fubing, Xue Tian, Liu Dandan, Hu Zhangyan //HGXC.cbpt.cnki.net ammunition destruction, charge area, charge density, pore area, stable combustion

34. Apr 30, 2021 @ 20:00:00.000 - JinKen College of Technology, Academy of Military Sciences, People's Liberation Army Engineering University, College of Field Engineering,People's Liberation Army Engineering University, Research Institute of Chemical Defense, College of Field Engineering, Research Institute of Chemical Defense, Academy of Military Sciences Jian-bin Li, Yong-bao Ai, Lei Fu, Ting Rui, Ming Lu, Xiao-qiang Yang, Jia-lin He //BAXY.cbpt.cnki.net dynamic environments, dynamic object probability model, object detection, visual slam

35. Apr 30, 2021 @ 20:00:00.000 防毒面具用Zr-MOFs吸附材料研究进展 防化研究院国民核生化灾害防护国家重点实验室, Research Institute of Chemical Defense, State Key Laboratory of NBC Protection for Civilian ZHOU Chuan, YANG Xiaobing, YANG Derui, YANG Bo, YANG Guang //CLDB.cbpt.cnki.net adsorption, gas mask, porous media, toxic gas, zr-mofs

36. Mar 28, 2021 @ 20:00:00.000 Research on Space Launch Visualization Simulation Analysis Technology and Application 军事科学院防化研究院, 北京跟踪与通信技术研究所 Zhong Yan, Wang Jia, Li Sujiang, Liu Xiuluo, Wu Feng, Liu Yang 系统仿真学报 ;Journal of System Simulation ; Editorial E-mail 3d visualization, digital experiment, simulation and evaluation, space launch informatization, virtual simulation

37. Mar 28, 2021 @ 20:00:00.000 航天发射可视化仿真分析技术与应用研究 军事科学院防化研究院, 北京跟踪与通信技术研究所 WU Feng, LIU Xiuluo, WANG Jia, ZHONG Yan, LI Sujiang, LIU Yang //XTFZ.cbpt.cnki.net 3d visualization, digital experiment, simulation and evaluation, space launch informatization, virtual simulation

38. Feb 17, 2021 @ 19:00:00.000A Reviewon Burning Damage Technology 军事科学院防化研究院 Yang Lin, Ma Shi-Zhou, Xu Guang-Ze, Zhang Liang, Gai Xi-Qiang, Zhang Xing-Gao 含能材料 ;Chinese Journal of Energetic Materials ;

Editorial E-mail burning damage, burning heat radiation, damage assessment, incendiary agent

39. Jan 31, 2021 @ 19:00:00.000 **金属-碳复合材料的制**备及其非线性光学性质研究 Academy of Military Science, Chemical Defense Institute, 军事科学院防化研究院 PENG Wen-lian, DAI Xiao-dong, ZHAO Wen-bo, LI Wei, ZHANG Tong, LIU Qing-hai, ZHANG Xing-gao //JGHW.cbpt.cnki.net impregnation method, metal-carbon composite materials, nonlinear optics, optical limiting, preparation

40. Jan 31, 2021 @ 19:00:00.000 **活性破片侵**彻Q235钢靶穿燃后效实验研究 军事科学院防化研究院, Research of Chemical Defense Academy of Military Science ZHANG Liang, GAI Xi-qiang, XU Guang-ze, ZHANG Xing-gao, YANG Lin, LUO Jun-xiao //HGPI.cbpt.cnki.net aftereffect of penetrating, energy release efficiency, ignite, reactive fragment

41. Jan 31, 2021 @ 19:00:00.000 **核化危害源**项反演技术现状及研究展望 Academy of Military Sciences, Research Institute of NBC Defense, 陆军防化学院指挥系, 军事科学院防化研究院, NBC Defense Institute Command department, GU Jin, WU Jie, JIANG Jinli, ZHOU Qiang, HAN Chaoshuai, ZHU Xuezheng //HGHB.cbpt.cnki.net algorithm, application platform, nuclear and chemical hazard, source term inversion

42. Jan 31, 2021 @ 19:00:00.000 **矩量法**计算烟幕粒子的红外消光特性 **防化研究院**, Research Institute of Chemical Defense LIU Qinghai, DAI Xiaodong, ZHANG Tong, PENG Wenlian, JIANG Yun //HWJS.cbpt.cnki.net infrared extinction, moment method, rotating body, smoke particles

43. Jan 31, 2021 @ 19:00:00.000 **碳气凝胶超**细粉体的可控制备技术 Academy of Military Science, Chemical Defense Institute, 军事科学院防化研究院 LIU Qinghai, DAI Xiaodong, ZHANG Tong, PENG Wenlian, YU Zhaoliang //FTJS.cbpt.cnki.net ball-milling technology, carbon aerogels, controllable preparation, ultrafine powder

44. Jan 31, 2021 @ 19:00:00.000 双模战斗部结构优化数值模拟研究 军事科学院防化研究院, Research of Chemical Defense Academy of Military Science ZHANG Liang, ZHANG Xinggao, FANG Guofeng, LI Xiaojun, LU Wei, XU Guangze //CUXI.cbpt.cnki.net dual mode warhead, jetting projectile charge, numerical simulation, shaped charge jet, structural optimization

45. Jan 31, 2021 @ 19:00:00.000 炭气凝胶/泡沫炭复合热防护材料的制备及性能研究 防化研究院国民核生化灾害防护国家重点实验室, Research Institute of Chemical Defense, State Key Laboratory of NBC Protection for Civilian Zheng Zi-xuan, Wang Xin-bo, Li Kai, Su Ru-yue, Liang Guo-jie, Li Li //TSJS.cbpt.cnki.net carbon aerogel, phenolic resin-based carbon foam, thermal protection

46. Jan 31, 2021 @ 19:00:00.000 星载红外高光谱传感器温度廓线反演综述 University of Chinese Academy of Sciences, 中国科学院空天信息创新研究院, Chinese Academy of Sciences, Academy of Military Sciences, 中国科学院大学, Aerospace Information Research Institute, Research Institute of Chemical Defense, 军事科学院防化研究院 LIU Shuanghui, LI Peng, LIU Xin, CAO Xifeng, LUO Qi, LI Xiaoying //YGXB.cbpt.cnki.net atmospheric temperature profile, error analysis, key issues, radiation transmission, satellite-borne infrared hyperspectral sensor

47. Jan 31, 2021 @ 19:00:00.000 Research progress of Hg2+ biosensor based on T-Hg2+-T structure 中国人民解放军军事科学院防化研究院, 中国人民大学环境学院 Zhu Anna, Long Feng, Zhou Yue, Song Dan, Liu Jiayao, Xu Wenjuan 环境化学 ;Environmental Chemistry ; Editorial E-mail biosensor, electrochemical assay, fluorescent assay, mercury ion, t-hg2+-t

48. Jan 31, 2021 @ 19:00:00.000 基于T-Hg2+-T结构的Hg2+生物传感器研究进展 School of Environment and Natural Resource, 中国人民解放军军事科学院防化研究院, Renmin University of China, Academy of Military Sciences PLA China, 中国人民大学环境学院, Research Institute of Chemical Defense LONG Feng, ZHOU Yue, XU Wenjuan, ZHU Anna, LIU Jiayao, SONG Dan

//HJHX.cbpt.cnki.net biosensor, electrochemical assay, fluorescent assay, mercury ion, t-hg2+-t

49. Jan 31, 2021 @ 19:00:00.000 **基于仿真**试验的防化保障行动能力评估 Academy of Military Sciences, 军事科学院防化研究院, Institute of Chemical Defense SUN Mao-sheng, HAN Wei-tao, ZHONG Yan, HUANG Li-zhou, ZUO Qin-wen, TIAN Xu-guang //HLYZ.cbpt.cnki.net chemical defense support, effectiveness evaluation, operation simulation, simulation test

50. Jan 30, 2021 @ 19:00:00.000 锂离子电池正极材料本体结构演变及界面行为研究方法 军事科学院防化研究院先进化学蓄电技术与材料北京市重点实验室, **中央**军委后勤保障部军需能源局 张松通, **邱景**义, **明海**, **杜**韫, **牟粤** **北大核心**;储能科学与技术 **原位表征**, **正极材料**, 电化学, **表-界面反**应, 锂离子电池

51. Jan 30, 2021 @ 19:00:00.000 **地下核爆地表振**动数值模拟 军事科学院防化研究院 **刘**伟, 郑毅 **北大核心**;**核**电子学与探测技术 ls-dyna, **地表振**动, **地下核爆炸**

52. Jan 30, 2021 @ 19:00:00.000 锂合金电极材料的研究进展分析 军事科学院防化研究院先进化学蓄电技术与材料北京市重点实验室, **北京化工大学化学工程学院** **牟粤**, 张松通, 张婷婷, **明海**, 杨晓飞, **邱景**义 **北大核心**;**中国材料**进展 **合金材料**, 负极, 锂电池, **高比容量**, 锂金属

53. Jan 30, 2021 @ 19:00:00.000 **新型**P（VDF-HFP）**基双功能高离子迁移数聚合物**电解质用于锂硫电池（英文） Beijing Key Laboratory of Advanced Chemical Energy Storage Technology and Materials, Research Institute of Chemical Defense, CATARC Automotive Test Center (Guangzhou) Co **王子**龙, 鲁建豪, **金朝**庆, **王**维坤, **王安邦**, **蒋江**辉 EI;Journal of Central South University **聚合物**电解质, 锂硫电池, 锂金属负极, pdda-tfsi-p（vdf-hfp）

54. Jan 30, 2021 @ 19:00:00.000 A gelatin-based artificial SEI for lithium deposition regulation and polysulfide shuttle suppression in lithium-sulfur batteries Beijing Key Laboratory of Electrochemical Process and Technology for Materials, Key Laboratory of Biomedical Materials of Natural Macromolecules, Ministry of Education, Beijing Advanced Innovation Center for Soft Matter Science and Engineering, Beijing University of Chemical Technology, Research Institute of Chemical Defense Yuepeng Guan, Xiaogang Sun, Hao Zhang, Yaqin Huang, Weikun Wang, Naseem Akhtar, Anbang Wang, Muhammad Yasir Akram, Fakhar Zaman, Long Chen EI;Journal of Energy Chemistry -

55. Jan 30, 2021 @ 19:00:00.000 化学组分对干水灭火剂流动性与保水性的影响 军事科学院防化研究院, 国民核生化灾害防护国家重点实验室 金青君, 张彤, 孔令冬, 刘香翠, 史红星 北大核心;化工进展 保水性, 流动性, 灭火组分, 干水

56. Jan 30, 2021 @ 19:00:00.000 基于变分同化的化学爆炸事故数值模拟研究 陆军防化学院, 军事科学院防化研究院 顾进, 韩朝帅, 诸雪征, 蒋金利 当代化工 变分同化, 数值模拟, 化学爆炸

57. Jan 30, 2021 @ 19:00:00.000 燃烧毁伤技术研究进展 军事科学院防化研究院 杨林, 张良, 盖希强, 马士洲, 张兴高, 徐光泽 北大核心;含能材料 毁伤评估, 燃烧剂, 燃烧热辐射, 燃烧毁伤

58. Jan 30, 2021 @ 19:00:00.000 多旋翼无人机弹药发射过程扰动响应特性 南京航空航天大学航空学院直升机旋翼动力学国家级重点实验室, 军事科学院防化研究院 康凯, 陈鹏, 李攀, 王梓旭, 王振雄 北大核心;航空动力学报 匹配选型, 弹药发射, 扰动响应, 飞行动力学模型, 多旋翼无人机

59. Jan 30, 2021 @ 19:00:00.000 基于GA-SVM的装备保障设备报废技术鉴定方法军事科学院防化研究院, 解放军32290部队, 山东省军区 安军政, 罗坤, 吴龙涛, 巩存阁 北大核心;火力与指挥控制 报废, 支持向量机, 遗传算法, 装备保障设备

60. Jan 30, 2021 @ 19:00:00.000 具有一氧化氮释放功能的人工血管材料 国防科技大学文理学院, 军事科学院防化研究院 胡碧茹, 申瑞秋, 刘志明, 宋俊祎 北大核心;中国组织工程研究 一氧化氮, 人工血管, 内皮化, 抗血栓, 组织工程, 综述, 血管支架, 材料

61. Jan 30, 2021 @ 19:00:00.000 Fe 军事科学院防化研究院 康凯, 何海燕, 王嘉伟, 刘艳, 谢长友 北大核心;火工品 fe o , 形貌, 热分解, 高氯酸铵, 复合含能材料

62. Jan 30, 2021 @ 19:00:00.000 化学组分对干水灭火剂充装性能的影响研究 中国人民解放军军事科学院防化研究院, 国民核生化灾害防护国家重点实验室 刘香翠, 孔令冬, 张彤, 史红星 北大核心;消防科学与技术 松密度, 灭火剂, 灭火组分, 耐压性, 干水

63. Jan 30, 2021 @ 19:00:00.000 公共卫生与健康管理领域发展态势研究——基于WoS论文的文献计量分析 中国科学院文献情报中心, 国家自然科学基金委员会管理科学部, 中国科学院大学经济与管理学院图书情报与档案管理系, 军事科学院防化研究院 伊惠芳, 刘细文, 朱晓行, 任之光, 龙艺璇, 丁洁兰 科学观察 国际合作, 学科态势, 文献计量, 研究热点, 论文资助, 公共卫生与健康管理

64. Jan 30, 2021 @ 19:00:00.000 核爆与闪电电磁脉冲信号识别方法综述 军事科学院防化研究院 曹保锋, 张震川 北大核心;核电子学与探测技术 模式识别, 闪电电磁脉冲, 核爆电磁脉冲

65. Jan 30, 2021 @ 19:00:00.000 基于不同氮源培养条件的巴氏芽孢杆菌脲酶功能转录组分析 国防科技大学文理学院, 军事科学院防化研究院 胡碧茹, 裴迪, 吴文健, 刘志明 北大核心;生物化学与生物物理进展 atp, 操纵子, 脲酶, 转录组, 巴氏芽孢杆菌

66. Jan 30, 2021 @ 19:00:00.000 **碳材料在金属化合物固**态储氢中的应用 军事科学院防化研究院先进化学蓄电技术与材料北京市重点实验室, **北京科技大学材料科学与工程学院** 陈俊红, **刘梦**, 赵鹏程, 陆林, **邱景义** **北大核心**;电源技术 **碳**, **金属化合物**, 储氢

Dec 31, 2020 @ 19:00:00.000 Advance on the application of MOFs in the degradation of chemical warfare agent **北京市工**业典型污染物资源化处理重点实验室北京科技大学能源与环境工程学院, **国民核生化灾害防**护国家重点实验室军事科学院防化研究院 Li Congju, Wu Yao, Zhang Xiuling, Xi Hailing **化工新型材料** ;New Chemical Materials ; Editorial E-mail ;2021(01)chemical warfare agent, heterogeneous catalysis reaction, metal-organic frameworks, singlet oxygen

67. Dec 31, 2020 @ 19:00:00.000 **金属有机框架材料在化学**战剂降解中的应用研究进展 **北京市工**业典型污染物资源化处理重点实验室北京科技大学能源与环境工程学院, University of Science and Technology Beijing, **国民核生化灾害防**护国家重点实验室军事科学院防化研究院, State Key Laboratory of NBC Protection for Civilian, School of Energy and Environmental Engineering, Key Laboratory of Resource-oriented Treatment of Industrial Pollutants, Research Institute of Chemical Defense Li Congju, Wu Yao, Zhang Xiuling, Xi Hailing //HGXC.cbpt.cnki.net chemical warfare agent, heterogeneous catalysis reaction, metal-organic frameworks, singlet oxygen

68. Dec 31, 2020 @ 19:00:00.000 钢靶分层厚度抗平头弹侵彻能力的影响规律研究 Institute of Chemical Denfense, Academy of Military Sciences, **南京理工大学机械工程学院**, School of Mechanical Engineering, Nanjing University of Science and Technology, 军事科学院防化研究院 GAI Xiqiang, XIE Changyou, LI Wei, WANG Jiangbo, LI Xiaojun, GAO Guangfa //DJZD.cbpt.cnki.net anti-penetrating, layer thickness, numerical simulation, ratio of thickness to diameter

69. Dec 31, 2020 @ 19:00:00.000 喷火器盘状油料点火管技术研究 **保利国防科技研究中心有限公司**, **防化研究院**, Research Institute of Chemical Defense, Poly Defence Research Center Co.Ltd. CHEN Wei, JIN Qing-jun, BI Peng-yu, WU Yu //HGPI.cbpt.cnki.net flamethrower, jet, oil ignition tube, structure

70. Dec 31, 2020 @ 19:00:00.000 Enhancing interfacial stability in solid-state lithium batteries with polymer/garnet solid electrolyte and composite cathode framework University of Science and Technology Beijing, Beijing Key Laboratory of Advanced Chemical Energy Storage Technologies and Materials, School of Materials Science and Engineering, Taiyuan University of Technology, Beijing Advanced Innovation Center for Materials Genome Engineering, Beijing Key Laboratory for Advanced Energy Materials and Technologies, University of Science and Technology Beijing, Beihang University, Shanxi Key Laboratory of New Energy Materials and Devices, Taiyuan University of Technology, Beijing Advanced Innovation Center for Materials Genome Engineering, Beijing Key Laboratory of Advanced Chemical Energy Storage Technologies and Materials, Research Institute of Chemical Defense, Research Institute of Chemical Defense, School of Materials Science and Engineering, Beihang University, Beijing Key Laboratory for Advanced Energy Materials and Technologies, Shanxi Key Laboratory of New Energy Materials and Devices Xiaoming Qiu, Li-Zhen Fan, Zhiming Bai, Long Chen //TRQZ.cbpt.cnki.net composite cathode framework, interfacial stability, li6.75la3zr1.75ta0.25o12, lithium metal batteries, polymer/garnet solid electrolyte

71. Dec 31, 2020 @ 19:00:00.000 静电纺纳米纤维在化学战剂"防消一体化"中的研究进展 北京市工业典型污染物资源化处理重点实验室北京科技大学能源与环境工程学院, University of Science and Technology Beijing, 国民核生化灾害防护国家重点实验室军事科学院防化研究院, State Key Laboratory of NBC Protection for Civilian, School of Energy and Environmental Engineering, Key Laboratory of Resource-oriented Treatment of Industrial Pollutants, Research Institute of Chemical Defense Li Congju, Xi Hailing, Zhang Xiuling, Sun Yaxin //HGXC.cbpt.cnki.net anti-degradation integration, chemical warfare agent, electrospinning, nanofiber

72. Dec 31, 2020 @ 19:00:00.000 Research progress on anti-degradation integration of CWAs by electrospun nanofiber 北京市工业典型污染物资源化处理重点实验室北京科技大学能源与环境工程学院, 国民核生化灾害防护国家重点实验室军事科学院防化研究院 Li Congju, Xi Hailing, Zhang Xiuling, Sun Yaxin 化工新型材料 ;New Chemical Materials ; Editorial E-mail ;2021(01) anti-degradation integration, chemical warfare agent, electrospinning, nanofiber

73. Dec 21, 2020 @ 19:00:00.000 Controllable preparation techniche of carbon aerogel ultrafine powder 军事科学院防化研究院 Dai Xiaodong, Zhang

Tong, Yu Zhaoliang, Liu Qinghai, Peng Wenlian 中国粉体技术 ;China Powder Science and Technology ; Editorial E-mail ball-milling technology, carbon aerogels, controllable preparation, ultrafine powder

74. Nov 30, 2020 @ 19:00:00.000 Activity of a new sleep substance with non-benzodiazepine sites 军事科学院防化研究院 Chen Xue-Jun, Wang Chen, Zhang Rui-Hua, Cui Ya-Lan, Shi Tong, Shi Meng, Xu Jian-Fu, Li Li-Qin, Zhang Yi, Deng Shi-Kun 中南药学 ;Central South Pharmacy ; Editorial E-mail ;2020(12) [~3h]-flunitrazepam, electrophysiology, gaba_ar, membrane potential detection, spontaneous activity

75. Nov 30, 2020 @ 19:00:00.000 Distribution of blast loading in cylindrical explosive containment vessels 陆军工程大学野战工程学院, 中国人民解放军78102部队, 中国人民解放军96901部队, 军事科学院防化研究院 Xu Jinglin, Gu Wenbin, Xu Boao, Liu Jianqing, Wang Zhenxiong, Lu Ming 振动与冲击 ;Journal of Vibration and Shock ; Editorial E-mail ;2020(18) cover shape, cylindrical explosive containment vessel, explosive pressure, mach reflection, numerical simulation

76. Nov 30, 2020 @ 19:00:00.000 Discussion on the development trend of small scale special fine chemical process automation and informatization 军事科学院防化研究院 Yu Meng, Liu Yingli, Zhu Wenchao, Guo Ning, Meng Lei, Zou Zhiyun 化工进展 ;Chemical Industry and Engineering Progress ; Editorial E-mail ;2020(S2) computer simulation, fine chemical process, prediction, process analysis, process control, process monitoring, production information management, production scheduling

77. Oct 31, 2020 @ 20:00:00.000 金属基消毒材料对芥子气降解研究进展 Key Laboratory of Resource-Oriented Treatment of Industrial Pollutants, College of Energy and Environmental Engineering, 北京科技大学能源与环境工程学院, Research Institute of Chemical Defense, 北京科技大学北京市工业典型污染物资源化处理重点实验室, State Key Laboratory of NBC Protection for Civilian, 军事科学院防化研究院国民核生化灾害防护国家重点实验室, University of Science and Technology Beijing ZHANG Boning, XU Wencai, XIN Yi, LI Congju, CHEN

Wenming, ZUO Yanjun, KONG Lingce //JXHG.cbpt.cnki.net chemical warfare agent, metal organic frameworks, metal oxide, mustard gas, polyoxometalate

78. Oct 31, 2020 @ 20:00:00.000 - Beijing Institute of Technology, Beijing Key Laboratory of Advanced Chemical Energy Storage Technology and Materials, Research Institute of Chemical Defense, School of Materials Science and Engineering, Beijing Key Laboratory of Advanced Chemical Energy Storage Technology and Materials, Research Institute of Chemical Defense, School of Materials Science and Engineering, Beijing Institute of Technology Yue Wang, Songtong Zhang, Yusheng Yang, Jingyi Qiu, Meng Li, Anbang Wang, Zhaoqing Jin, Hai Ming, Pengcheng Zhao //TRQZ.cbpt.cnki.net anode, ferrosilicon, lithium-ion batteries, material structural design, micrometer-sized si, multi-layered carbon nanosheets

79. Oct 31, 2020 @ 20:00:00.000增材制造用金属粉末制备技术研究现状及展望 Institute of Chemical Defense, College of Chemical Engineering, 南京理工大学化工学院, Nanjing University of Science and Technology, 军事科学院防化研究院, Academy of Military Sciences ZHANG Kaichuang, MA Shizhou, CHEN Houhe, ZHANG Xinggao, GAI Xiqiang, HE Jie //GXGC.cbpt.cnki.net additive manufacturing, centrifugal atomization method, spherical powder, spheroidization method, two-stream atomization method

80. Oct 21, 2020 @ 20:00:00.000Adsorption behavior of water molecules on porous carbon materials 军事科学院防化研究院国民核生化灾害防护国家重点实验室 Zheng Chao, Zhou Shuyuan, Bai Shupei, Song Hua, Kang Kai 化工进展 ;Chemical Industry and Engineering Progress ; Editorial E-mail adsorption, pore structure, porous carbon materials, surface functional groups, water molecules

81. Oct 20, 2020 @ 20:00:00.000Study on the Influence of Target Layer Thickness on Anti-Penetration of Flat-nosed Projectile 军事科学院防化研究院, 南京理工大学机械工程学院 Gao Guangfa, Xie Changyou, Li Wei, Wang Jiangbo, Gai Xiqiang, Li Xiaojun 弹箭与制导学报 ;Journal of Projectiles;Rockets;Missiles and Guidance ; Editorial E-mail anti-penetrating, layer thickness, numerical simulation, ratio of thickness to diameter

82. Sep 30, 2020 @ 20:00:00.000Determination of sarin in environmental gas by gas chromatography-pulse flame photometric detector 军事科学院防化研究院

Wang Hongying, Chen Yankun, Chen Peng, Wang Jinsheng, Hao Huanming
分析试验室 ;Chinese Journal of Analysis Laboratory ; Editorial E-mail ;2020(10) gas chromatography-pulse flame photometric detector, gas monitoring, sarin

83. Aug 31, 2020 @ 20:00:00.000 Attapulgite nanorods assisted surface engineering for separator to achieve high-performance lithium–sulfur batteries Beijing Key Laboratory of Electrochemical Process and Technology for Materials, Key Laboratory of Biomedical Materials of Natural Macromolecules,Ministry of Education, Beijing University of Chemical Technology, Key Laboratory of Biomedical Materials of Natural Macromolecules, Beijing University of Chemical Technology, Institute of Electrical Engineering, Chinese Academy of Sciences, Research Institute of Chemical Defense, Institute of Electrical Engineering, Chinese Academy of Sciences, Beijing Key Laboratory of Electrochemical Process and Technology for Materials, Ministry of Education Weikun Wang, Kai Wang, Chengming Li, Naseem Akhtar, Xiaogang Sun, Wenhao Sun, Anbang Wang, Yaqin Huang //TRQZ.cbpt.cnki.net multi-metal oxide, separator, shuttle effect, surface engineering, synergistic effect

84. Jul 31, 2020 @ 20:00:00.000 刺激剂室内效能数值仿真研究 国民核生化灾害防护国家重点实验室, 军事科学院防化研究院, Research Institution of Chemical Defense, Academy of Military Sciences, State Key Laboratory of NBC Protection for Civilian XIAO Kai-tao, WANG Hai-tao, XU Lu-cheng, SONG Wei-wei //JSJZ.cbpt.cnki.net computational fluid dynamics, discrete phase model, dispersion simulation, indoor efficiency, irritant agent, numerical simulation

85. May 31, 2020 @ 20:00:00.000 超细粉体团聚性表征技术研究 Academy of Military Sciences, 军事科学院防化研究院, Institute of Chemical Defense LIU Yingli, LI Cong, ZHU Wenchao, ZOU Zhiyun, CHANG Ying //FTJS.cbpt.cnki.net agglomeration, characterization, dispersion pressure, ultrafine powder

86. May 31, 2020 @ 20:00:00.000 Research Progress on Enzymatic Decontamination of Vx by Phosphotriesterase 国民核生化灾害防护国家重点实验室, 中国人民解放军军事科学院防化研究院 Zhou Lei, Zheng He, Guo Xuan, Zhong Jinyi 环境科学与技术 ;Environmental Science & Technology ; Editorial E-mail ;2020(06)enzymatic decontamination, molecular modification, nerve agent, phosphotriesterase, vx

87. May 31, 2020 @ 20:00:00.000 Research on agglomeration characterization technology of ultrafine powder 军事科学院防化研究院 Liu Yingli, Zhu Wenchao, Chang Ying, Li Cong, Zou Zhiyun 中国粉体技术 ;China Powder Science and Technology ; Editorial E-mail ;2020(06) agglomeration, characterization, dispersion pressure, ultrafine powder

88. May 31, 2020 @ 20:00:00.000 Research Progress on Enzymatic Decontamination of Vx by Phosphotriesterase 国民核生化灾害防护国家重点实验室, 中国人民解放军军事科学院防化研究院 Zhou Lei, Zheng He, Guo Xuan, Zhong Jinyi 环境科学与技术 ;Environmental Science & Technology ; Editorial E-mail ;2020(06)enzymatic decontamination, molecular modification, nerve agent, phosphotriesterase, vx

89. May 5, 2020 @ 20:00:00.000 Gain analysis of combustion on the external ballistic range of liquid jet 军事科学院防化研究院 Xie Changyou, Lu Wei, Li Wei, Gai Xiqiang, Li Xiaojun 弹箭与制导学报 ;Journal of Projectiles;Rockets;Missiles and Guidance ; Editorial E-mail combustion, external ballistic, liquid jet, range gain

90. Apr 30, 2020 @ 20:00:00.000 Research on Deep Learning Method of Atmospheric Low Frequency Acoustic Signal Recognition 电子科技大学计算机科学与工程学院, 军事科学院防化研究院 Chen Xiao-Lei, Wu Yun-Hui, Zou Shi-Ya, Zhao Zi-Tian 电子科技大学学报 ;Journal of University of Electronic Science and Technology of China ; Editorial E-mail ;2020(05) atmospheric low-frequency sound, convolution neural network, deep learning, signal recognition, support vector machine

91. Apr 30, 2020 @ 20:00:00.000 Study on a humidity controllable radon chamber system based on soil-radon 军事科学院防化研究院核防护研究所, 北京大学物理学院核物理与核技术国家重点实验室 Mao Yucai, Guo Qiuju, Wang Yunxiang, Zhang Lei 辐射防护 ;Radiation Protection ; Editorial E-mail ;2020(05) humidity control, radon chamber, radon concentration control, radon gas, radon in soil

92. Apr 16, 2020 @ 20:00:00.000 Research progress of metal-organic frame-based flexible composites 北京科技大学能源与环境工程学院, 军事科学院防化研究院国民核生化灾害防护国家重点实验室, 北京科技大学北京市工业典型污染物资源化处理重点实验室 Li Congju, Zhang Xiuling, Sun Yaxin, Xi Hailing 精细化工 ;Fine Chemicals ; Editorial E-mail aerogel, flexible substrate, metal-organic frameworks, mixed matrix film, nanofiber

93. Mar 31, 2020 @ 20:00:00.000 燃烧对液柱射流外弹道射程的增益分析研究 Academy of Military Sciences, 军事科学院防化研究院, Research Institute of Chemical Defense LI Wei, LU Wei, GAI Xiqiang, XIE Changyou, LI Xiaojun //DJZD.cbpt.cnki.net combustion, external ballistic, liquid jet, range gain

94. Mar 31, 2020 @ 20:00:00.000 Quantitative Analysis and Characterization of the Expansion Characteristics of Expandable Graphite by High Speed Shadow Imaging 军事科学院防化研究院功能材料研究所, 陆军装备部装备项目管理中心, 中国科学技术大学热科学和能源工程系 Zhang Liang, Chen Liang, Xu Guang-Ze, Fang Guo-Feng, Shi Wei-Dong, Xu Yi 火工品 ;Initiators & Pyrotechnics ; Editorial E-mail ;2020(04) expandable graphite, expansion characteristics, expansion ratio, hot gas flow, image analysis

95. Mar 31, 2020 @ 20:00:00.000 聚能装药壳体对环形射流侵彻性能的影响 中北大学机电工程学院, School of Mechatronics Engineering, 中北大学地下目标毁伤技术国防重点学科实验室, 军事科学研究院防化研究院, North University of China, National Defense Key Laboratory of Underground Damage Technology, Research Institute of Chemical Defense, Academy of Military Sciences XU Feng, HE Jiangrun, LI Xiaojun, LU Wei, CHEN Zhigang, ZHAN Tingbian, FU Jianping //DJZD.cbpt.cnki.net annular shaped charge jet, cases, detonation wave, numerical simulation, power performance

96. Mar 31, 2020 @ 20:00:00.000 Infrared Extinction Characteristic of Flake-like Carbon-Metal Composite Materials 军事科学院防化研究院功能材料研究所 Peng Wen-Lian, Zhao Wen-Bo, Liu Qing-Hai, Dai Xiao-Dong, Zhang Tong 火工品 ;Initiators & Pyrotechnics ; Editorial E-mail ;2020(04) composite materials, electro-optical countermeasure, flake-like carbon, infrared, smoke screen

97. Mar 31, 2020 @ 20:00:00.000 Research Prospect of Fine Chemical Process and Equipment Detection and Monitoring Technology 军事科学院防化研究院 Yu Meng, Liu Yingli, Meng Lei, Zou Zhiyun 石油化工自动化 ;Automation in Petro-Chemical Industry ; Editorial E-mail ;2020(04) chemical equipment, detection technology, development trends, fine chemical process, monitoring technology

98. Mar 31, 2020 @ 20:00:00.000 Gain Analysis of Combustion on the External Ballistic Range of Liquid Jet 军事科学院防化研究院 Xie Changyou, Lu Wei, Li Wei, Gai Xiqiang, Li Xiaojun 弹箭与制导学报 ;Journal of Projectiles;Rockets;Missiles and Guidance ; Editorial E-mail ;2020(04) combustion, external ballistic, liquid jet, range gain

99. Mar 31, 2020 @ 20:00:00.000 Study on dynamic response of multi-degree-of-freedom explosion vessel system under impact load College of Field Engineering Army Engineering University of PLA, Unit No.31696 of PLA, Unit No.78102 of PLA, Research Institute of Chemical Defense Jian-qing Liu, Xin Liu, Yun-hao Hu, Wen-bin Gu, Zhen-xiong Wang, Yang-ming Han, Jing-lin Xu //BAXY.cbpt.cnki.net dynamic coefficient, dynamic response, explosion vessel, load feature, vibration analysis

100. Feb 29, 2020 @ 19:00:00.000Mg/αβ/PTFE红外诱饵剂的辐射性能表征与计算 Academy of Military Sciences, 军事科学院防化研究院, Research Institute of Chemical Defense WU Yu, SHI Hong-xing, REN Xiu-juan, JIN Qing-jun, ZHAO Jian-feng //HGPI.cbpt.cnki.net addictive, combustion products, infrared decoy, radiation intensity

101. Feb 29, 2020 @ 19:00:00.000Uncertainty analysis and evaluation for purity determination of sulfur mustard 中国人民解放军军事科学院防化研究院 Huang Yongpeng, Chen Bo, Meng Xiangyan, Tang Hui, Jiao Jianlan 化学分析计量 ;Chemical Analysis and Meterage ; Editorial E-mail ;2020(03) acid-base titration, purity, sulfur mustard, uncertainty

102. Feb 29, 2020 @ 19:00:00.000基于分装结构的CS刺激剂爆炸分散过程研究 陆军防化学院, Institute of Chemical Defense, State Key Laboratory of Explosion Science and Technology, 军事科学院防化研究院, Beijing Institute of

Technology, Research Institute of Chemical Defense, 北京理工大学爆炸科学与技术国家重点实验室 LI Ting, JIANG Zhi-gang, SUN Hang, LIANG Ting, LI Jiang-cun //HNCL.cbpt.cnki.net aerosol clouds, divided structure, explosive dispersion, irritant agent

103. Feb 29, 2020 @ 19:00:00.000Recent Progress of Bionic Adaption Camouflage Materials 军事科学院防化研究院, 北京化工大学高新技术研究院 Cui Zhifeng, Zhang Mengqing, Wu Yu, Jin Qingjun, Bi Pengyu 中国表面工程 ;China Surface Engineering ; Editorial E-mail ;2020(03) adaptive camouflage, bionic, camouflage materials, composites, dynamic stealth

104. Jan 31, 2020 @ 19:00:00.000 Study on the Effect of Solid and Powder Exciting Force on Centrifuge Rotor Vibration 军事科学院防化研究院 Liu Ying-Li, Chang Ying, Li Cong, Yu Hong-Wei 化工机械 ;Chemical Engineering & Machinery ; Editorial E-mail ;2020(02) centrifuge, exciting force, rotor, unbalanced load, unbalanced response

105. Jan 31, 2020 @ 19:00:00.000 PLC control of a fine chemical production process军事科学院防化研究院 Yu Meng, Liu Yanjun, Guo Ning, Meng Lei, Zou Zhiyun 计算机与应用化学 ;Computers and Applied Chemistry ; Editorial E-mail ;2020(02)auto-tuning pid, control software programming, fine chemical process, hmi configuration, programmable logic controller (plc)

106. Jan 30, 2020 @ 19:00:00.000 军用低温起动电池发展研判 军事科学院防化研究院先进化学蓄电技术与材料北京市重点实验室, 双登集团股份有限公司江苏省电化学储能技术重点实验室 刘巍, 明海, 邱景义, 曹高萍, 周洪 北大核心;电源技术 低温环境, 冷起动电流, 电压降, 高功率, 起动电池

107. Jan 30, 2020 @ 19:00:00.000 A novel permselective organo-polysulfides/PVDF gel polymer electrolyte enables stable lithium anode for lithium–sulfur batteriesSchool of Material Science and Engineering, Jiangsu Collaborative Innovation Center of Photovoltaic Science and Engineering, Jiangsu Province Cultivation base for State Key Laboratory of Photovoltaic Science and Technology, Changzhou University, Military Power Sources Research and Development Center, Research Institute of Chemical Defense, Institute of Intelligent Flexible Mechatronics, Jiangsu University Xin-Yu Zhou, An-bang Wang, Jian-Ning Ding, Wei-kun

Wang, Fang-Lei Zeng, Ning-Yi Yuan, Yan-Qiu Shen EI;Journal of Energy Chemistry -

108. Jan 30, 2020 @ 19:00:00.000 P School of Materials Science and Engineering, Beijing Institute of Technology, Military Power Sources Research and Development Center, Research Institute of Chemical Defense, Department of Material Science and Engineering, Beijing University of Chemical Technology, Wanhua Chemical Group Co Weikun Wang, Xiaojun Liu, Yusheng Yang, Yaqin Huang, Meng Li, Anbang Wang, Zhaoqing Jin, Qian Li EI;Journal of Energy Chemistry -

109. Jan 30, 2020 @ 19:00:00.000 专家信度优化的装备效能评估方法 军事科学院防化研究院, 河南省疾病预防控制中心 李发明, 李昂, 左钦文, 梅刚, 党李成 北大核心;火力与指挥控制 层次分析, 指标权重, 模糊量化模型, 专家信度

110. Jan 30, 2020 @ 19:00:00.000 P（VDF-HFP）-poly（sulfur-1;3-diisopropenylbenzene） functional polymer electrolyte for lithium–sulfur batteries Beijing Advanced Innovation Center for Materials Genome Engineering, Institute of Advanced Materials and Technology, University of Science and Technology Beijing, Military Power Sources Research and Development Center, Research Institute of Chemical Defense Wei-Kun Wang, Li-Zhen Fan, An-Bang Wang, Jiang-Hui Jiang, Zhao-Qing Jin EI;Journal of Energy Chemistry -

111. Jan 30, 2020 @ 19:00:00.000 华北北部半干旱地区夏季大气边界层特征的实验研究 北京大学物理学院大气与海洋科学系气候与海-气实验室, 军事科学院防化研究院 肖凯涛, 张宏升, 鞠婷婷, 李倩惠 北大核心;北京大学学报(自然科学版) 低空急流, 半干旱地区, 地表能量收支, 大气边界层高度

112. Jan 30, 2020 @ 19:00:00.000 圆柱形爆炸容器内爆炸载荷的分布规律 陆军工程大学野战工程学院, 中国人民解放军78102部队, 军事科学院防化研究院, 中国人民解放军96901部队 徐博奥, 陆鸣, 顾文彬, 王振雄, 刘建青, 徐景林 北大核心;振动与冲击 内爆载荷, 数值模拟, 端盖形状, 马赫反射, 圆柱形爆炸容器

113. Jan 30, 2020 @ 19:00:00.000 石墨烯氮掺杂调控及对电容特性影响机制研究进展 军事科学院防化研究院, 中国矿业大学(北京)机电与信息工程学院, 后勤保障部军需能源局 赖日鑫, 张文峰, 明海, 向宇, 曹高萍, 姜传建, 杜韫, 张浩, 刘琳 CSCD;储能科学与技术 作用机制, 掺杂氮构型, 调控方法, 超级电容器, 石墨烯氮掺杂

**ANNEX B: Closed-Source Research Produced by the Research Institute of Chemical Defense (军事科学院防化研究院)**

1. Feb 15, 2023 @ 19:00:00.000金属有机骨架材料对单组分CO2吸附的研究进展_参考网 张香梅，孙源，杨帅鹏，刘茜，吕丽，王春来，金君素(1.北京化工大学化学工程学院 膜分离过程与技术北京市重点实验室，北京 100029；2 应用化工

2. Nov 17, 2022 @ 19:00:00.000 虎杖苷对小鼠芥子气肺损伤的保护作用_参考网 王雨润，岑金凤，孟文琪，裴志鹏，肖 凯，谢 颖*，孙铭学*1.湖南师范大学医学院分子流行病学湖南省重点实验室，长沙 4100002.海军军 第二军医大学学报

3. Nov 15, 2022 @ 19:00:00.000 信号采样对Cs2LiYCl6:Ce3+探测器中子-伽马甄别性能的影响_参考网 吴坤， 黄广伟， 王利斌， 李林祥， 席善学， 陈声强， 徐思， 张立功， 朱红英， 王尊刚， 刘辉兰， 宋玉收， 周春芝(1.哈尔滨工程 哈尔滨工程大学学报

4. Oct 21, 2022 @ 20:00:00.000工科研究生专业课高效教学方案探索_参考网 张浩(军事科学院防化研究院，北京 100191)进入21世纪以来，知识爆炸的态势愈发明显。根据中国科学技术信息研究所的统计数据，2017 广州化工

5. Sep 29, 2022 @ 20:00:00.000局部复合药型罩威力性能数值模拟研究_参考网 印立魁， 王维占，程 瑶， 李小军，孟凡高， 赵太勇，陈智刚(1.中北大学 地下目标毁伤技术国防重点学科实验室，太原 030051； 振动与冲击

6. Jul 5, 2022 @ 20:00:00.000 氡防护体系动态介绍与评述_参考网 郭秋菊，张 磊(1.北京大学物理学院核物理与核技术国家重点实验室，北京 100871；2.军事科学院防化研究院，北京 102205)铀系衰 辐射防护

7. Jul 4, 2022 @ 20:00:00.000 基于福岛核事故监测数据的辐射剂量场重构方法研究_参考网 徐 瑶，陈晓雷，黄广伟，吴浿晖，陈 林(军事科学院防化研究院，北京 102205)准确评定核事故后危险区等级是维护国家核安全和国防安全的重 辐射防护

8. Jun 28, 2022 @ 20:00:00.000子母式干扰弹战斗部结构设计与抛撒策略_参考网 高欣宝， 李笑楠， 陈 浩(1.陆军工程大学 石家庄校区，河北 石家庄 050003；2.军事科学院 防化研究院，北京 102205)随着 陆军工程大学学报

9. Jun 22, 2022 @ 20:00:00.000生物安全新质力量 推动科技创新发展<br/>——记张家港长三角生物安全研究中心_参考网 ◎ 张家港长三角生物安全研究中心主任 周 蕾（文/马志毅、何蕾、胡秋实、刘旭、田胜男）自2003年的“非典”至今，禽流感、埃博拉出血热、中 中国科技产业

10. Jun 5, 2022 @ 20:00:00.000 CMIP5模式对青藏高原中东部夏季降水双极型模拟能力的评估_参考网 李斐斐，刘朝晖(1.中国人民解放军军事科学院防化研究院，北京 102205； 2.山东省气象台，山东 济南 250031)引言青藏高原(t 海洋气象学报

11. Jun 5, 2022 @ 20:00:00.000 大气压低温等离子体发射光谱检测含磷有毒气体(模拟剂)方法研究_参考网 杨金传，安金龙，李 聪，朱文超*，黄邦斗，章 程，邵 涛1.省部共建电工装备可靠性与智能化国家重点实验室，河北工业大学，天津 300130 光谱学与光谱分析

12. May 6, 2022 @ 20:00:00.000 储能电站可靠性与安全性技术研究进展_参考网 高维娜,于海青,苏文威,邱景义(1.中华人民共和国应急管理部消防救援局,北京 100032; 2.中央军委后勤保障部军需能源技术服务中心, 电池

13. Apr 21, 2022 @ 20:00:00.000 褶皱氧化石墨烯的制备与应用研究进展_参考网 曾 旭，朱彬彬，邱 伟，李伟丽，郑晓慧*，徐 斌*（1. 北京化工大学材料科学与工程学院，有机无机复合材料国家重点实验室 材料 新型炭材料

14. Mar 23, 2022 @ 20:00:00.000 褐边绿刺蛾幼虫刺毛结构及蛰伤机制初探_参考网 杨乐乐，段琛媛，李 晶，孟凡华，曹 瑛，代先东，张爱兵*，范崇旭*(1.军事科学院防化研究院，北京 102205；2. 首都师范大学生命 环境昆虫学报

15. Mar 16, 2022 @ 20:00:00.000 圆柱形爆炸容器的内壁爆炸载荷*_参考网 刘 欣，顾文彬，蔡星会，王 涛，刘建青，王振雄，沈慧铭（1. 火箭军工程大学核工程学院，陕西 西安 710038；2. 陆军工程大学野战工 爆炸与冲击

16. Dec 28, 2021 @ 19:00:00.000 战场多级核生化态势生成方法研究_参考网 朱子薇，刘国永，贺潇磊，呼欣章，左钦文（1.北方自动控制技术研究所，太原 030006；2.军事科学院防化研究院，北京 102205）0 火力与指挥控制

17. Dec 2, 2021 @ 19:00:00.000 旋翼飘带稳定式子弹降落弹道特性_参考网 宋晨,李 磊(军事科学院防化研究院， 北京 102200)1 引言子母弹是一种对付地面多目标的武器，当母弹飞行到目标区域上空的一定高度， 兵器装备工程学报

18. Nov 2, 2021 @ 20:00:00.000 Visual SLAM in dynamic environments based on object detection_参考网 Yong-o Ai ,Ting Rui ,Xio-qing Yng ,* ,Ji-lin He ,Lei Fu ,Jin-in L Defence Technology

19. Oct 25, 2021 @ 20:00:00.000锂合金电极材料的研究进展分析_参考网 牟 粤，邱景义，杨晓飞，张婷婷，张松通，明 海(1.军事科学院防化研究院 先进化学蓄电技术与材料北京市重点实验室，北京 100191)(2 中国材料进展

20. Oct 11, 2021 @ 20:00:00.000一种改进变换网络的域自适应语义分割网络_参考网 张峻宁, 苏群星, 王 成, 徐 超, 李一宁(1.陆军工程大学, 石家庄 050003; 2.陆军指挥学院, 南京 210000;3.国 上海交通大学学报

21. Aug 29, 2021 @ 20:00:00.000 超细SC/Fe2O3@AP核壳结构复合粒子的制备及表征_参考网 曾江保，陈 雍，边桂珍，王德齐，殷传传，高 强，郑胜军，刘 杰(1.江西航天经纬化工有限公司，江西 吉安 343700；2.军事科学院防化 新技术新工艺

22. Jul 21, 2021 @ 20:00:00.000 燃烧毁伤技术研究进展_参考网 徐光泽，张 良，张兴高，盖希强，马士洲，杨 林（军事科学院防化研究院，北京 102205）1 引言现代军事科技日新月异，从集束火箭、火炮等 含能材料

23. Jul 19, 2021 @ 20:00:00.000 稳定、中性条件风速标准差对烟幕扩散的影响_参考网 徐路程，肖凯涛，宋伟伟，张 奇，李庆伟(1.军事科学院防化研究院，北

京 102205；2.国民核生化灾害防护国家重点实验室，北京 1022 科学技术与工程

24. May 13, 2021 @ 20:00:00.000 TiO2/C复合材料用于钠离子电池负极的性能研究_参考网 徐 梦, 刘博文，吴 昱，刘庆雷(1. 上海交通大学 金属基复合材料国家重点实验室，上海 200240)(2. 中国人民解放军军事科学院防化研 中国材料进展

25. Apr 23, 2021 @ 20:00:00.000 钢靶分层厚度抗平头弹侵彻能力的影响规律研究_参考网 李小军，李 伟，谢长友，盖希强，王江波，高光发(1 军事科学院防化研究院，北京 102205；2 南京理工大学机械工程学院，南京 2100 弹箭与制导学报

26. Mar 8, 2021 @ 19:00:00.000 金属-碳复合材料的制备及其非线性光学性质研究_参考网 彭文联,刘清海,赵文博,代晓东,张兴高,张 彤,李 伟(军事科学院防化研究院,北京 102205)1 引 言非线性光学在光信息存储、全光通 激光与红外

27. Mar 4, 2021 @ 19:00:00.000 双模战斗部结构优化数值模拟研究_参考网 徐光泽，张 良，张兴高，卢 薇，李小军，方国峰(军事科学院防化研究院，北京 102205)高效毁伤技术作为武器装备中的核心关键技术之一， 兵器装备工程学报

28. Nov 1, 2020 @ 19:00:00.000 基于数据可视化软件的量子点研究现状分析*_参考网 王宿慧 张 旭 郭腾霄 丁学全（1.军事科学院防化研究院 北京 102205）（2.国民核生化灾害防护国家重点实验室 北京 102205） 计算机与数字工程

29. Oct 14, 2020 @ 20:00:00.000大气低频声信号识别深度学习方法研究_参考网 吴涢晖，赵子天，陈晓雷，邹士亚*(1. 军事科学院防化研究院 北京 昌平区 102205；2. 电子科技大学计算机科学与工程学院 成都 6 电子科技大学学报

30. Sep 22, 2020 @ 20:00:00.000战场信息分发系统中的高效模糊匹配算法_参考网 刘晓宏，雷伟斌，刘国永，孙 娟，左钦文（1.国营第七八五厂，太原 030024；2.北方自动控制技术研究所，太原 030006；3.军事科 火力与指挥控制

31. Sep 16, 2020 @ 20:00:00.000燃烧对液柱射流外弹道射程的增益分析研究*_参考网 李小军，盖希强，李 伟，卢 薇，谢长友(军事科学院防化研究院，北京 102205)0 引言液柱射流是抛物运动的一种特殊形态，由于液体运动 弹箭与制导学报

32. Aug 21, 2020 @ 20:00:00.000 专家信度优化的装备效能评估方法*_参考网 李发明，党李成，左钦文*，李 昂，梅 刚（1.军事科学院防化研究院，北京 102205；2.河南省疾病预防控制中心，郑州 450000）0 火力与指挥控制

33. Aug 13, 2020 @ 20:00:00.000 爆炸型烟幕弹遮蔽效能仿真研究_参考网 徐路程，郝雪颖，肖凯涛，宋伟伟，陈春生(1.军事科学院 防化研究院, 北京 102205; 2.国民核生化灾害防护国家重点实验室，兵工学报

34. Jul 28, 2020 @ 20:00:00.000 碳气凝胶军事应用技术研究进展_参考网 于照亮，刘清海，张彤，彭文联，代晓东（军事科学院防化研究院，北京 102205）1 引言在军事应用领域，新材料是军用高技术的基础，开发应用 炭素

35. Jul 1, 2020 @ 20:00:00.000 Study on dynamic response of multi-degree-of-freedom explosion vessel system under impact load_参考网 Yun-ho Hu , Wen-in Gu ,*, Jin-qing Liu , Jing-lin Xu , Xin Liu , Yng- Defence Technology

36. Jun 2, 2020 @ 20:00:00.000 芥子气纯度测定不确定度分析与评定_参考网 唐慧，黄永鹏，孟祥燕，陈博，焦剑岚（中国人民解放军军事科学院防化研究院，北京 102205）芥子气是双功能烷基化试剂，也是糜烂性化学战剂中 化学分析计量

37. Mar 27, 2020 @ 20:00:00.000 基于分装结构的CS刺激剂爆炸分散过程研究_参考网 李 廷，梁 婷，李江存，孙 航，蒋志刚（1.陆军防化学院，北京 阳坊 102205；2.军事科学院防化研究院，北京 阳坊 102205；3 含能材料

38. Jan 7, 2020 @ 19:00:00.000 基于稀疏表示的离子迁移谱谱图去噪及基线校正算法研究_参考网 张根伟，彭思龙，曹树亚*，赵 将，杨 柳，杨 杰，杨俊超，黄启斌*1. 军事科学院防化研究院，北京 102205 2. 国民核生化灾害防 光谱学与光谱分析

39. Nov 7, 2019 @ 19:00:00.000 杜仲产业大事记_参考网 中国林业产业杂志编辑部辑一、1952年，我国政府接受专家的建议，开始在青岛橡胶二厂生产杜仲胶。二、1981年年底，中国科学院化学所严瑞芳副 中国林业产业

40. Oct 24, 2019 @ 20:00:00.000膨胀石墨粒子浓度及粒径分布测量试验研究_参考网 蒋 云，徐 毅，代晓东，刘清海，张 奇，陈春生膨胀石墨粒子浓度及粒径分布测量试验研究蒋 云1，徐 毅2，代晓东1，刘清海1，张 奇1，陈春 火工品

41. Sep 11, 2019 @ 20:00:00.000核壳型量子点-纳米金颗粒组装体高效检测神经性毒剂模拟剂_参考网 李盛菘, 郑永超,2, 孟澍临, 吴骊珠, 钟近艺,2, 赵冲林,2核壳型量子点-纳米金颗粒组装体高效检测神经性毒剂模拟剂李盛菘1, 郑永 无机材料学报

42. Sep 1, 2019 @ 20:00:00.000 水下钻孔爆破水底振动信号的频带能量分布研究_参考网 詹发民,王振雄,赵守田,顾文彬,李 磊,余留芳(1.海军潜艇学院， 山东 青岛 266042； 2.军事科学院防化研究院， 北京 1022 兵器装备工程学报

43. Aug 5, 2019 @ 20:00:00.000 微纤维- 活性炭双床层对苯蒸汽吸附动力学研究_参考网 王浛沄, 叶平伟,2, 李凯， 皇甫喜乐， 司芳芳(1.军事科学院 防化研究院, 北京 100191； 2.国民核生化灾害防护国家重点实验 兵工学报

44. Aug 5, 2019 @ 20:00:00.000 基于红外遮蔽的地面烟幕防空阵地部署模型研究_参考网 曾照凯， 朱东升， 郭潇迪， 王丁, 高晓辉(1.军事科学院 防化研究院, 北京 102205; 2.中国人民武装警察部队研究院 装备技术 兵工学报

45. Jun 4, 2019 @ 20:00:00.000 可燃合金储氢性能实验研究_参考网 任秀娟, 张兴高，师宏心，彭文联，金青君，刘 喆可燃合金储氢性能实验研究任秀娟，张兴高，师宏心，彭文联，金青君，刘 喆（军事科学院防化研究院 火工品

46. May 4, 2019 @ 20:00:00.000 发烟弹装药贮存环境应力分析与老化动力学_参考网 张兴高，安文书，程万影，盖希强，马士洲，郝雪颖，李红欣，赵 新(军事科学院防化研究院， 北京 102205)弹药系统一般由引信、弹丸、药筒 兵器装备工程学报

47. May 4, 2019 @ 20:00:00.000 基于Q准则的燃烧弹热辐射效果评估研究_参考网 安文书,卢 薇,李红欣,马士洲,程万影(军事科学院防化研究院， 北京 102205)燃烧武器主要包括喷火器以及各类燃烧弹药等，利用燃烧剂对 兵器装备工程学报

48. Apr 8, 2019 @ 20:00:00.000 基于燃气生成速率比的发射药破碎程度定量表征方法*_参考网 陈言坤 马士洲 汪海涛 白 云军事科学院防化研究院(北京,

102205)引言经过多年研究，国内外对发射装药引起膛炸的机理已形成共识，即 :弹 爆破器材

49. Apr 8, 2019 @ 20:00:00.000 空心钨球侵彻性能的研究※_参考网 杨 帅 赵太勇 陈智刚 李小军 李 伟 兰宇鹏 史俊青①中北大学机电工程学院(山西太原, 030051)②中北大学地下目标毁伤技术国防重点学 爆破器材

50. Mar 18, 2019 @ 20:00:00.000 新型防化发烟车RMST一体化设计与关键技术分析_参考网 ，，，(1.军事科学院科研部，北京 100091； 2.军事科学院防化研究院，北京 100091)0 引言防化发烟车主要用于对重要目标实施 计算机测量与控制

51. Nov 27, 2018 @ 19:00:00.000 7.62 mm穿甲子弹斜侵彻复合装甲仿真研究_参考网 李小军，王维占，张 银，雷文星, 陈智刚(1. 军事科学院防化研究院， 北京 102205； 2. 中北大学地下目标毁伤技术国防重点 装甲兵工程学院学报

52. Oct 15, 2018 @ 20:00:00.000气相色谱-三重四极杆串联质谱检测尿样中神经性毒剂代谢产物烷基膦酸类化合物_参考网 杨 旸， 闫 珑， 李晓森，袁 铃，邢中方， 刘石磊*(1.军事科学院防化研究院分析测试中心，北京 102205；2.国民核生化灾害防护国 分析测试学报

53. Aug 26, 2018 @ 20:00:00.000 基于弹速传感器辨识弹道的气温气压影响修正方法*_参考网 赵 新,盖希强,李小军,吕 静(1 军事科学院防化研究院,北京 102205;2 陆军工程大学石家庄校区,石家庄 050003)0 引言我 弹箭与制导学报

54. Aug 12, 2018 @ 20:00:00.000 Mg、Al及Ni粉对GAP燃烧性能的影响_参考网 王亮亮，刘 艳，陈春生，张兴高，安文书，刘海峰Mg、Al及Ni粉对

GAP燃烧性能的影响王亮亮，刘 艳，陈春生，张兴高，安文书，刘海峰（防火工品

55. Jul 10, 2018 @ 20:00:00.000 基于TDLAS检测技术的甲烷体积分数场重建研究_参考网 张 旭，曹树亚，郭腾霄，董力强，杨 柳，原 博，丁学全(中国人民解放军军事科学院 防化研究院 国民核生化灾害防护国家重点实验室，北京 1 激光技术

56. Apr 18, 2018 @ 20:00:00.000 烟幕防空与指挥控制_参考网 曾照凯，朱东升（军事科学院防化研究院，北京 102205）0 引言未来防空作战中，实现多种防空力量在多维战场空间的协同作战是大势所趋，而鉴 火力与指挥控制

57. Feb 12, 2018 @ 19:00:00.000金属粉末点火温度测试装置的设计与试验_参考网 安文书，张兴高，吕 玺，盖希强金属粉末点火温度测试装置的设计与试验安文书1，张兴高1，吕 玺2，盖希强1(1.军事科学院防化研究院，北京 火工品

58. Feb 5, 2018 @ 19:00:00.000 纺织军民融合发展进入深水期_参考网 梁瑞丽十九大报告指出，将"更加注重军民融合"纳入新时代中国特色社会主义基本方略，将"坚定实施军民融合发展战略"作为全面建成小康社会的重大战略，将"形成军民融合深度发展格局"作为全面建设一流军队的重要途径。军民融合已进入新的发展期，特种纺织品行业、功能性及高性能技术纺织品正进入一个大发展的战略机遇期。2017中国产业用纺 中国纺织

59. Oct 12, 2017 @ 20:00:00.000编码板成像系统MLEM算法优化_参考网 李汉平 王锋 艾宪芸编码板成像系统MLEM算法优化李汉平 王锋 艾宪芸（国民核生化灾害防护国家重点实验室防化研究院 北京 102205） 核技术

60. Nov 20, 2016 @ 19:00:00.000 双电层电容器储能机理研究概述_参考网 向宇，曹高萍双电层电容器储能机理研究概述向 宇，曹高萍（防化研究院，北京 100083）本文综述了双电层电容器的储能机理研究进展，详细 储能科学与技术

61. Oct 8, 2016 @ 20:00:00.000 海军舰艇核生化集体防护发展概况_参考网 周平，张忠良，康 健，王 磊，游俊琴（防化研究院，北京 100191）海军舰艇核生化集体防护发展概况周平，张忠良，康健，王磊，游俊琴

62. （ 舰船科学技术

63. Jul 18, 2016 @ 20:00:00.000 组态软件和OPC技术在化工过程仿真中的应用研究_参考网 孟磊，邹志云，任夫健，王志甄，于洪伟，盖希杰(防化研究院，北京 102205)组态软件和OPC技术在化工过程仿真中的应用研究孟磊，邹志云 石油化工自动化

64. Apr 20, 2016 @ 20:00:00.000 基于物联网的声表面波传感器阵列检测系统研究_参考网 刘鑫璐，王 文，潘 勇，邵晟宇，穆 宁(1.中国科学院 声学研究所，北京100190;2.防化研究院，北京102205)基于物联网的声表 郑州大学学报（工学版）

65. Mar 12, 2016 @ 19:00:00.000 γ相机的发展和应用_参考网，（国民核生化灾害防护国家重点实验室防化研究院，北京 102205）γ相机的发展和应用李汉平，艾宪芸（国民核生化灾害防护国家重点实验室防化 核安全

66. Feb 14, 2016 @ 19:00:00.000化学威胁的医学对抗：抗毒药物研究现状和进展_参考网 周文霞，刘 港，张永祥（军事医学科学院毒物药物研究所，抗毒药物与毒理学国家重点实验室，北京 100850）化学威胁的医学对抗：抗毒药物研究 中国药理学与毒理学杂志

67. Nov 2, 2015 @ 19:00:00.000 Pole-placement self-tuning control of nonlinear Hammerstein system and its application to pH process control_参考网 Zhiyun Zou*,Dandan Zhao,Xinghong Liu,Yuqing Guo,Chen Guan,Wenqiang Fe Chinese Journal of Chemical Engineering

68. Oct 23, 2015 @ 20:00:00.000层状超分子烟幕材料红外干扰性能研究_参考网 毕鹏禹，吴 昱，聂风泉，曹 浪，冯拥军，李殿卿（1. 防化研究院，北京，102205；2. 北京化工大学 化工资源有效利用国 火工品

69. May 15, 2015 @ 20:00:00.000 氡子体比的现场测量及其对剂量转换系数的影响_参考网 赵桐可，郑平辉，阿不都莫明·卡地尔，张 磊，郭秋菊，＊（1.北京大学物理学院核物理与核技术国家重点实验室，北京 100871；2.中国人民 原子能科学技术

70. Feb 25, 2015 @ 19:00:00.000基于PLC和触摸屏的电加热水浴温度控制系统设计_参考网 孟磊，邹志云，赵丹丹，郭宇晴，刘兴红(防化研究院，北京 102205)基于PLC和触摸屏的电加热水浴温度控制系统设计孟磊，邹志云，赵丹丹 石油化工自动化

71. Apr 2, 2014 @ 20:00:00.000 Bootstrap非参数法在γ能谱处理中的应用_参考网 徐红鹃 王 锋 艾宪芸 李京伦 魏 星 石 磊1（北京防化研究院 北京 102205）2（国民核生化灾害防护国家重点实验室 北京 1022 核技术

72. Jan 12, 2014 @ 19:00:00.000 Bootstrap非参数法在γ能谱处理中的应用_参考网 徐红鹃 王 锋 艾宪芸 李京伦 魏 星 石 磊1（北京防化研究院 北京 102205）2（国民核生化灾害防护国家重点实验室 北京 1022

**Annex C: Data-driven Defense Against China's Adversarial Intentions**

For the analysis of The Research Institute of Chemical Defense, Data Abyss, a cutting-edge adversarial strategic S&T focused OSINT (Open-Source Intelligence) search engine, was employed to collect and analyze all the references in Annex A and B. As a commercial-ready product, Data Abyss offers valuable tools for analysts in various fields, including research security, counterintelligence, export control, IP protection, cyber security, and S&T policy. Its analytic products have been utilized to support governmental departments such as State, Defense, Energy, Commerce, Trade, and the Intelligence Community. Leveraging Software as a Service (SaaS) and Data as a Service (DaaS) capabilities, Data Abyss combines deep web collection techniques with S&T data archives to ensure continuous, timely, and relevant data collection and insights. Powered by state-of-the-art containerized applications, frameworks, search engines, authentication, and hosting, Data Abyss delivers advanced capabilities for both commercial and defense OSINT needs, making it a vital resource in the comprehensive analysis of The Research Institute of Chemical Defense and its activities.