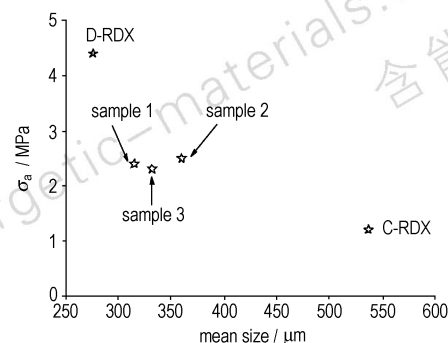


**Reduced Sensitivity Explosive Crystals**

NIE Fu-de

*Chinese Journal of Energetic Materials*, 2010, 18(5): 481–482

In this specific issue, 9 papers addressed the various issues of reduced sensitivity explosive crystals preparation, characterization, properties and performance in China.

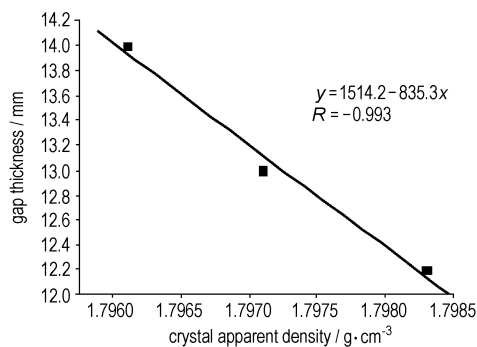
**Fluctuation Analysis of Compression Curves of RDX****Crystalline Ensembles**

LI Ming, HUANG Ming, XU Rui-juan,

KANG Bin, LI Hong-zhen

*Chinese Journal of Energetic Materials*, 2010, 18(5): 483–486

The crystalline ensemble composed of recrystallized RDX (D-RDX) particles bears the maximum fluctuation amplitude during pressing compared to the rest of particle ensembles.

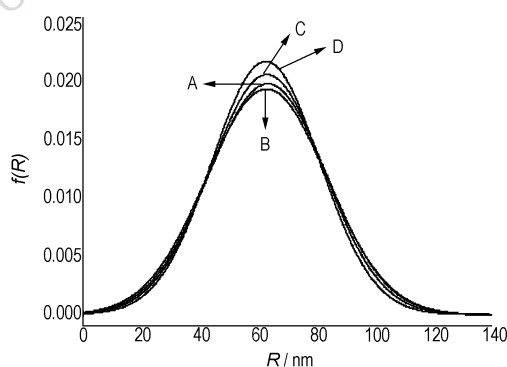
**Effects of RDX Crystal Characteristics on Shock Sensitivities**

LI Hong-zhen, KANG Bin, LI Jin-shan, XU Rong,

HUANG Ming, LU Xiao-jun, ZHANG Yong

*Chinese Journal of Energetic Materials*, 2010, 18(5): 487–491

Effects of RDX characteristics including crystal internal porosity, particle size and distribution on shock sensitivities were studied by applying a method that RDX particles immersed in rap oil which excludes effects on shock sensitivity of binder/crystal interface, binder porosity and crystal shape.

**RDX Micro-structure by Small Angle X-Ray Scattering**

YAN Guan-yun, HUANG Chao-qiang, SUN Guang-ai,

CHEN Bo, HUANG Ming, LI Hong-zhen

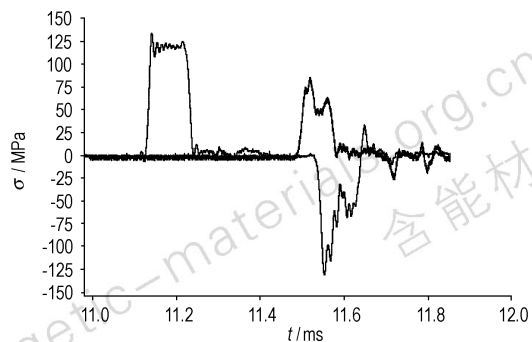
*Chinese Journal of Energetic Materials*, 2010, 18(5): 492–496

Small angle X-ray scattering (SAXS) was used to analyze the micro-structure of RDX. The Guinier simulation, poly-dispersion analysis and Porod analysis were used. And magnitudes, scales and internal surface of defects in RDX were investigated.

### Impact Safety of PBX-based RDX/D-RDX

HUA Cheng, SHU Yuan-jie, WU Bo,  
HUANG Ming, LI Tao, FU Hua

*Chinese Journal of Energetic Materials*, 2010, 18(5): 497–500

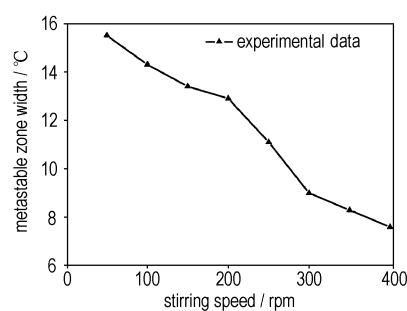


An impact safety experiment have been designed which can indicate the dynamic change process and the impact sensitivity of explosive sample, and the approach helps to further understand and study the microscopic structure of explosives with different response mechanism to external stimuli.

### Preparation of Insensitive RDX by Cooling Crystallization Method

ZHU Yong, WANG Bo-zhou, GE Zhong-xue, LI Pu-ru

*Chinese Journal of Energetic Materials*, 2010, 18(5): 501–504



Crystallization behavior of RDX in different solvents were investigated. An in-depth study involved the cooling crystallization of RDX from cyclohexanone was conducted, stirring speed affect the particle size and its distribution mainly, while the cooling rate determine the number and size of internal defects.

### Preparation and Properties of Rounded HMX

XU Rong, LI Hong-zhen, HUANG Ming, NIE Fu-de, CHEN Ya

*Chinese Journal of Energetic Materials*, 2010, 18(5): 505–509

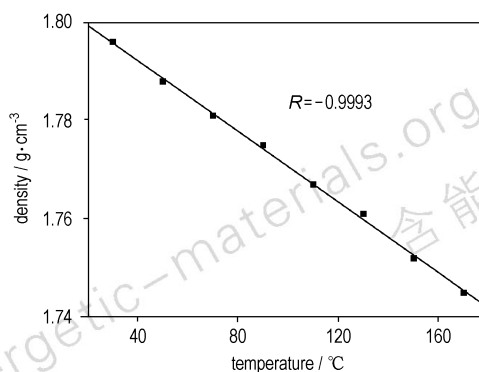


HMX with round and smooth crystal particles was prepared, and its particle size, morphology, packing density, thermal and mechanics properties of the raw and rounded HMX were characterized.

### Measurement of CTE and Theoretical Density of Explosive Crystal by XRD

SUN Jie, ZHANG Hao-bin, SHU Xiao-yan,  
LIU Yu, LIU Xiao-feng, KANG Bin

*Chinese Journal of Energetic Materials*, 2010, 18(5): 510–513

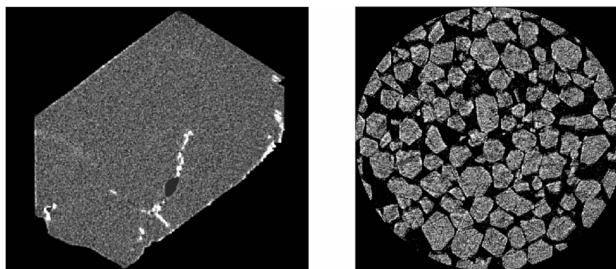


By means of X-ray powder diffraction and Rietveld refinement, the coefficient of thermal expansion and theoretical density of RDX crystal was obtained, which are approved to be reliable and accurate by comparing the change coefficient and value at 20 °C of theoretical density with measured results.

### Characterization on Microscopic Structures of HMX and RDX with $\mu$ CT

ZONG He-hou, ZHANG Wei-bin, DAI Bin

*Chinese Journal of Energetic Materials*, 2010, 18(5): 514–517

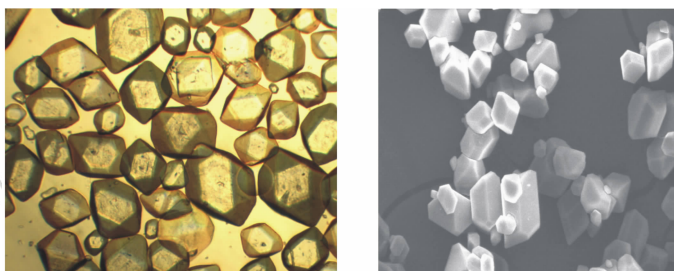


The microscopic structures of typical crystal explosives (HMX and RDX) were studied including single crystals and loose stacked crystal particles with  $\mu$ CT.

### Characterization and Properties of Desensitized Octogen

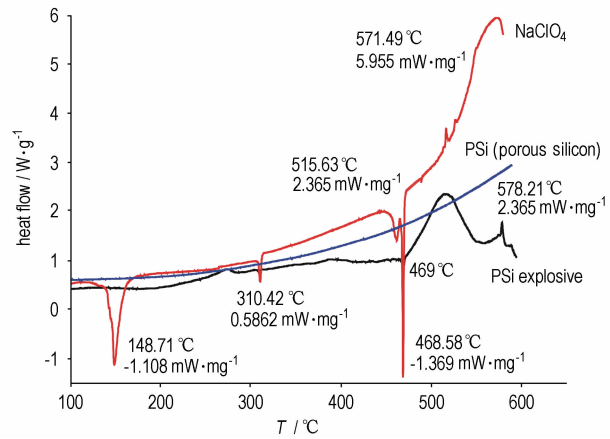
XU Rui-juan, KANG Bin, HUANG Hui, CHEN Ya,  
JIANG Yan, XIA Yun-xia, NIE Fu-de

*Chinese Journal of Energetic Materials*, 2010, 18(5): 518–522



A kind of desensitized octogen (D-HMX) was characterized with various analysis methods. D-HMX is  $\beta$ -HMX explosive with high crystal quality. Which has better morphology, less crystal defects, better thermal properties and takes great effect on reducing shock sensitivity in both cast and pressed PBX formulations.

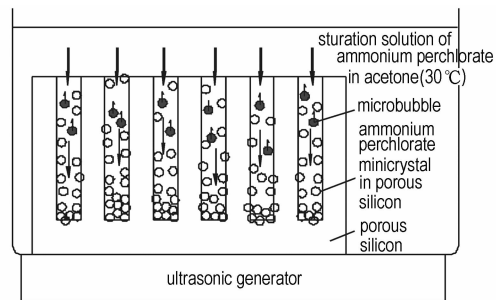
### Properties of Energetic Materials Based on Nano-porous Silicon



XUE Yan, LU Bin, REN Xiao-ming, XIE Rui-zhen,  
LIU Lan, ZHANG Jing-xin, LIANG Guo-ying  
*Chinese Journal of Energetic Materials*, 2010, 18(5) : 523 –526

Porous silicon with sponge-like structure builds up a mechanically stable skeleton for an oxidant. The thermal behavior of the porous silicon explosive was investigated by means of DSC.

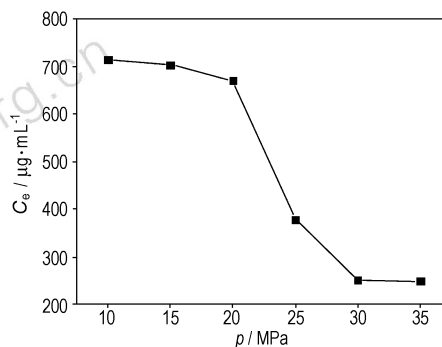
### Preparation and Properties of porous Silicon Energetic Chips



WANG Shou-xu, SHEN Rui-qi, YE Ying-hua  
*Chinese Journal of Energetic Materials*, 2010, 18(5) : 527 –531

The porous silicon was prepared by electrochemical etching and it was filled ammonium perchlorate or sodium perchlorate with in-situ method in order to get porous silicon energetic chips.

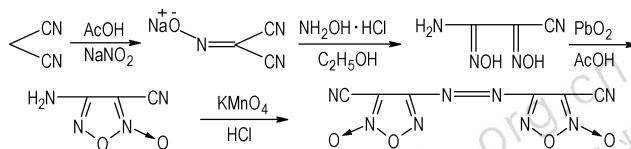
### Nucleation Rate of Ultrafine HMX Recrystallized by Carbon Dioxide Gas Anti-solvent Method



WANG Hai-qing, CHEN Jian-gang, YAO Li-na,  
LIU Zhong-wen, LIU Zhao-tie  
*Chinese Journal of Energetic Materials*, 2010, 18(5) : 532 –537

HMX particles were prepared by GAS method. Through the nucleation rate equation, the nucleation rates of the HMX were calculated at a pressure range of 10 ~ 35 MPa. The scanning electronic microscope (SEM) photographs of HMX were also presented and the mean size and size distribution of HMX particles were obtained through statistical analysis of SEM photographs.

### Synthesis and Characterization of 3,3'-Dicyano-4,4'-azofuroxan



LUO Yi-fen, MA Ling, WANG Bo-zhou,  
ZHOU Yan-shui, HUO Huan, JIA Si-yuan

*Chinese Journal of Energetic Materials*, 2010, 18(5): 538–540

3,3'-Dicyano-4,4'-azofuroxan was synthesized from malononitrile by a four-step reaction, and the structures of the aim compound and all of the intermediates were confirmed by spectroscopical and elemental analysis.

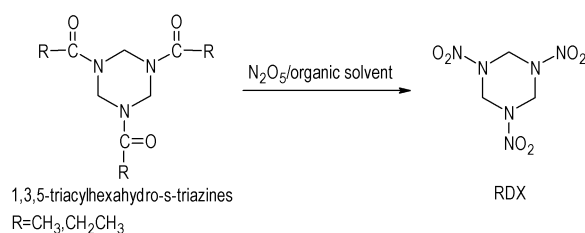
### One-pot Synthesis of Neopentyl Glycol Diazo Dinitrate

ZHANG Li-jie, CUI Jun-min, ZHANG Chuan,  
CUI Rong, MA Ling

*Chinese Journal of Energetic Materials*, 2010, 18(5): 541–543

Neopentyl glycol diazo dinitrate was synthesized by one-pot process from 1,3-dibromo-2,2-dihydroxymethylpropane with 80% yield and 98% purity.

### Preparation of RDX via Nitrolysis 1,3,5-Triacylhexahydro-s-triazines with $N_2O_5$

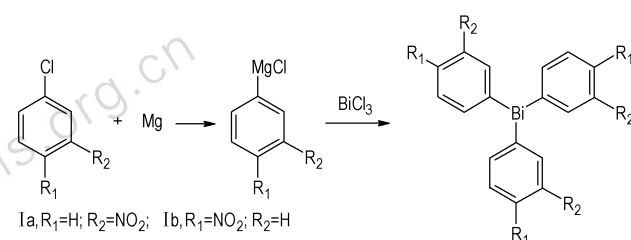


XIE Zhi-yong, YE Zhi-wen

*Chinese Journal of Energetic Materials*, 2010, 18(5): 544–547

A novel nitration for preparing RDX, i. e. nitrolysis triazine derivatives with  $N_2O_5$  in nonacidic media was investigated. The product structure was characterized by IR,  $^1H$  NMR and elemental analysis.

### Synthesis and Catalytic Effect of Tris-(nitrophenyl) bismuthine Complex



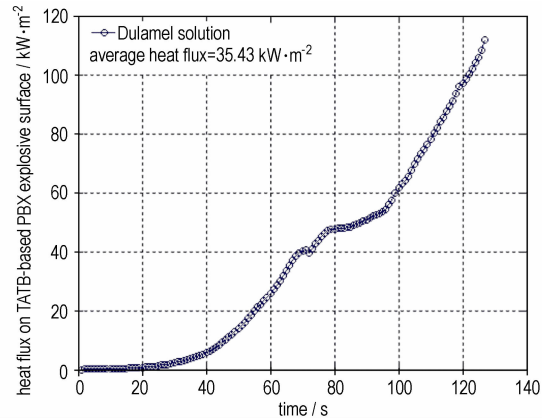
CHENG Xuan, LI Zhan-xiong

*Chinese Journal of Energetic Materials*, 2010, 18(5): 548–550

Tris-(*m*-nitrophenyl) bismuthine and tris-(*p*-nitrophenyl) bismuthine were synthesized via Grignard reaction and metal transfer method, and their structures were characterized by FTIR,  $^1H$  NMR, and MS. The catalytic effect of curing solid propellant HTPB was studied by DTA.

### Numerical Simulation and Experimental Study of Fast Cook-off of TATB-based PBX Explosive

ZHANG Xu, GU Yan, ZHANG Yuan-ping,  
LI Qiang, GONG Yan-qing, SUN Yong-qiang  
*Chinese Journal of Energetic Materials*, 2010, 18(5): 551–557



The fast cook-off of TATB-based PBX explosive sample with 2 mm thickness steel casing was investigated under solid propellant fires in a well-defined scenario such as failed launch of a missile. In addition, its temperature distribution was numerically investigated. Temperature rising and ignition time of the explosive surface were also calculated with the experimental data and Duhamel superposition principal.

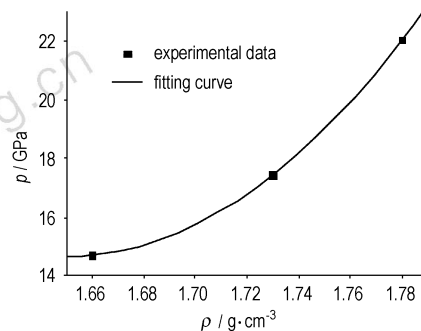
### Microwave Effects and Mechanism in Explosives Materials

YU Wei-fei, ZHANG Tong-lai, ZUO Jun, LI Gang, YANG Li,  
LI Jin-shan, HUANG Yi-gang, HUANG Hui  
*Chinese Journal of Energetic Materials*, 2010, 18(5): 558–562

Various microwave effects on explosive materials were summarized in this study including microwave measurement of explosive performance, microwave application to explosives synthesis/preparation/desiccation/recycle, and microwave initiation of explosives materials. Microwave intentional/accidental initiation experiments were discussed and hotspot initiation theory was still effectual in explanation with microwave fundamental and selective heating effect.

### Effect of Charge Density and Size on Detonation Pressure and Detonation Velocity of RDX-based Aluminized Explosive

WANG Wei, WANG Jian-ling, GUO Wei, LI Xin, XIAO Qi  
*Chinese Journal of Energetic Materials*, 2010, 18(5): 563–567

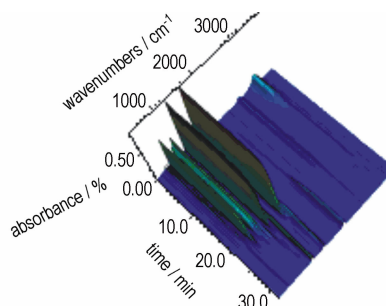


Manganin pressure transducers and probes were used to study the effects of charge density and charge size on detonation pressure and detonation velocity of RDX-based aluminized explosive.

### Thermal Behavior and Thermal Decomposition Mechanism of Nitrate Glycerol Ether Cellulose

ZHANG You-de, SHAO Zi-qiang, LI Bo,  
XU Si-yu, GU Yong-jun, WANG Yan-ping

*Chinese Journal of Energetic Materials*, 2010, 18(5): 568–573



The thermal decomposition mechanism of NGEC was studied by means of TG/DTG, DSC and RFST-IR. The kinetic and thermodynamic parameters and the critical temperature of thermal explosion were calculated.

### Effect of Plastic Nitrocellulose on Mechanical Property and Process of Casting High Energy Composite Modified Double-Base Propellant with Low Smoke

WANG Han, FAN Xue-zhong, LIU Xiao-gang,  
YU Hong-jian, FAN Ming-hui

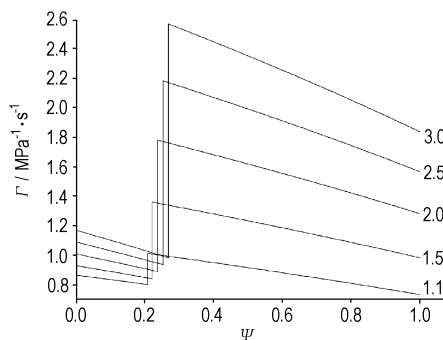
*Chinese Journal of Energetic Materials*, 2010, 18(5): 574–578

Effect of contents of plastic nitrocellulose (PNC) on preparation process, the pot life, mechanical property, physical cross-linking density, continuity and close-grained property of casting high energy composite modified double-base (CMDDB) propellant with low smoke, and packing effect of binder system to particles in the propellants were studied.

### Theoretical Analysis of Gas Generation about Variable Burning Rate Gun Propellant with Square Plate-shape

ZHONG Jian-hua, ZHANG Li-hua, XIAO Zhong-liang,  
WU Qing-wen, MA Zhong-liang

*Chinese Journal of Energetic Materials*, 2010, 18(5): 579–582

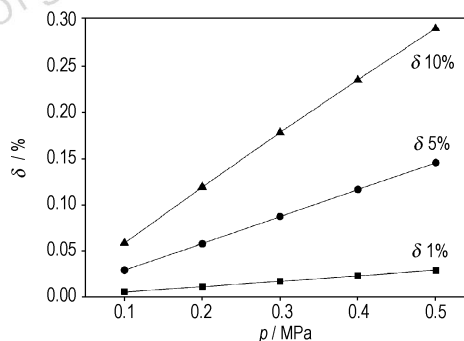


The gas generation about variable burning rate gun propellant with square plate-shape was theoretically calculated and analyzed.

### Computational Study of Flow for Outside Layer of Variable-burning Rate Propellant During Extrusion

LIU Lin-lin, MA Zhong-liang,  
GAO Ke-zheng, XIAO Zhong-liang

*Chinese Journal of Energetic Materials*, 2010, 18(5): 583–586

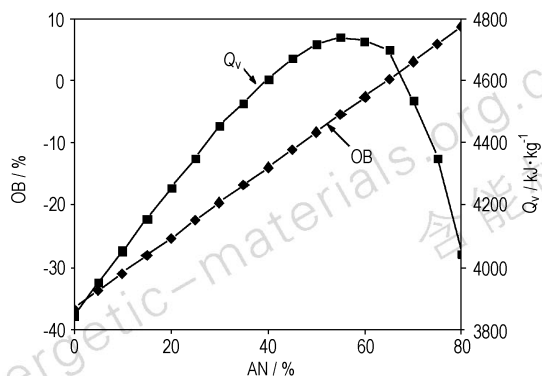


To study the factors affecting the conformity of the type and size of the variable-burning rate propellant and provide a reference to the actual operation for setting the appropriate parameter, three-dimensional flows of variable-burning rate propellant solution in the screw were simulated using the polyflow software under different operating conditions.

### Adjustment of Oxygen Balance for Single-base Propellant

Lü Zhi-xing, HE Zeng-di, XIAO Zhong-liang,  
ZHENG Dong-sheng, ZHONG Jian-hua

*Chinese Journal of Energetic Materials*, 2010, 18(5) : 587 –591



The oxygen balance, flame temperature, explosion heat, specific energy and gas component were calculated by the minimum free energy method.

### Review on Azotetrazolate Nonmetal Salts

WANG Qiong, LI Ji-zhen, YU Hong-jian,  
FU Xiao-long, FAN Xue-zhong, JI Yue-ping

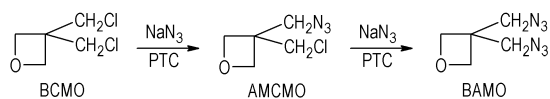
*Chinese Journal of Energetic Materials*, 2010, 18(5) : 592 –598

The properties and developments of syntheses and applications in propellants and gas generators of some azotetrazolate nonmetal salts were summarized.

### Review on Synthesis of BAMO and Its Homopolymer

WANG Wen-hao, ZHOU Ji-yi

*Chinese Journal of Energetic Materials*, 2010, 18(5) : 599 –603

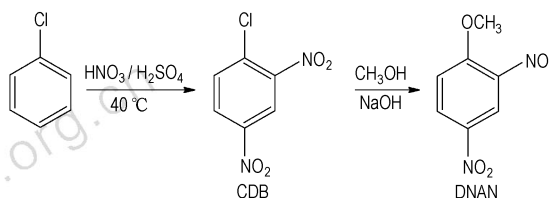


The developments of synthesis of 3, 3-bis ( azidomethyl ) oxetane ( BAMO ) and its homopolymer were reviewed.

### Review on Melt-Castable Explosives Based on 2,4-Dinitroanisole

ZHANG Guang-quan, DONG Hai-shan

*Chinese Journal of Energetic Materials*, 2010, 18(5) : 604 –609



The synthesis and properties of 2,4-dinitroanisole ( DNAN ) including thermal characteristic and compatibility with relevant materials were overviewed. As a key ingredient in low sensitivity melt-castable explosives, DNAN-based formulations were also reviewed.

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