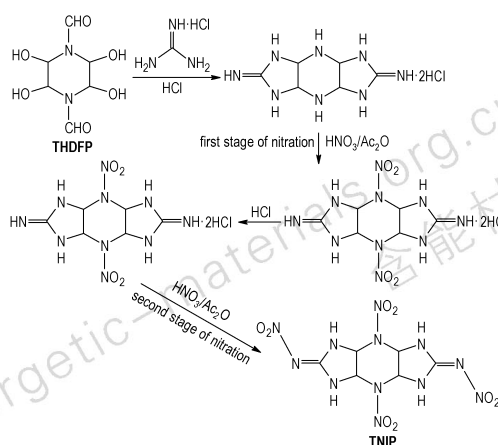


### Synthesis and Properties of *N, N'*-(4, 8-Dinitrooctahydroimidazo[4, 5-b: 4', 5'-e] piperazine-2, 6(1H, 3H)-diylidene) dinitramide

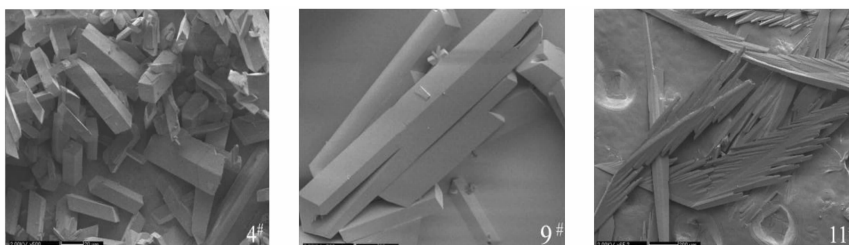


*N, N'*-(4, 8-Dinitrooctahydro-diimidazo[4, 5-b: 4', 5'-e] piperazine-2, 6(1H, 3H)-diylidene) dinitramide (TNIP) was synthesized with glyoxal formamide and guanidine hydrochloride as starting materials, and the factors affecting nitration reactions were investigated.

XU Kui, LU Ming

*Chinese Journal of Energetic Materials*, 2015, 23(8): 716–719

### Preparation and Characterization of LLM-105 Crystals with Different Morphology in the Ionic Liquid

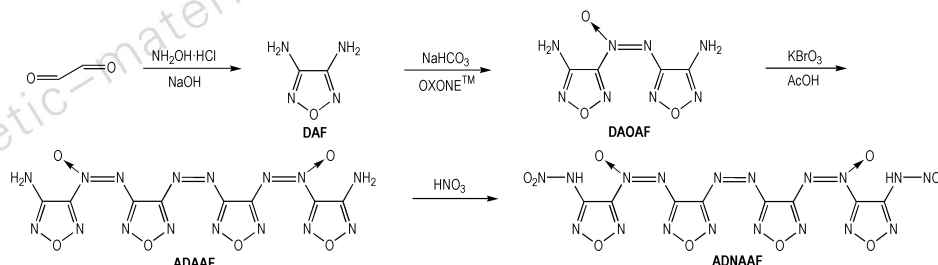


LLM-105 crystals with different morphology were recrystallized by using ionic liquids of [Bmim]BF<sub>4</sub> and [Bmim]CF<sub>3</sub>SO<sub>3</sub> as solvents under different solvent temperature, water volume and standing conditions. The recrystallized crystals were characterized by SEM, XRD, DSC-TG, FTIR and purity analysis.

PU Liu, XU Jin-jiang, SONG Gong-bao, SUN Jie

*Chinese Journal of Energetic Materials*, 2015, 23(8): 720–726

### Synthesis and Thermal Performance of Bis[4-nitraminofurazanyl-3-azoxy]azofurazan

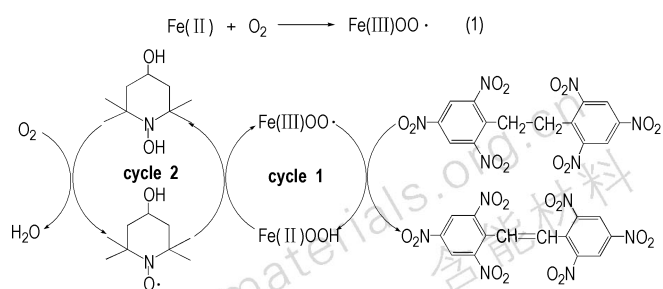


Bis[4-nitraminofurazanyl-3-azoxy]azofurazan (ADNAAF) was synthesized from bis[4-aminofurazanyl-3-azoxy]azofurazan (ADAAF) using glyoxal as starting material. The thermal properties of ADAAF and ADNAAF were studied by differential scanning calorimetry and thermogravimetry analysis. The detonation performances of ADNAAF were estimated by Gaussian 03.

XU Li-wen, ZHENG Chun-mei, WANG Tian-yi, XIA Cheng-bo, WEI Wen-jie, WANG Feng-yun, LEI Wu, XIA Ming-zhu

*Chinese Journal of Energetic Materials*, 2015, 23(8): 727–731

## Catalytic System for Green Synthesis of HNS



Hexanitrostilbene (HNS) was synthesized via aerobic dehydrogenation of hexanitrobibenzyl (HNBB) with 4-hydroxyl-2,2,6,6-tetramethylpiperidine-1-oxyl (4-OH-TEMPO) combined ferrous chloride ( $\text{FeCl}_2$ ) as catalyst in dimethylsulfoxide (DMSO). The optimum conditions were obtained.

CAO Xiao-hua, LU Ting-ting, LU Ming

*Chinese Journal of Energetic Materials*, 2015, 23(8): 732–736

## Prediction and Control of Crystal Morphology of BTNA



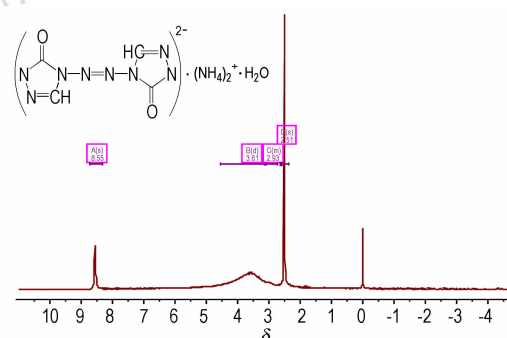
Bis(2,2,2-trinitroethyl) amine (BTNA) was synthesized according to literatures and the crystal morphology and crystallization behavior of BTNA were calculated by Growth Morphology method. The relationship between the structures of important crystal faces and media of crystallization were analyzed.

REN Xiao-ting, DU Tao, HE Jin-xuan, LU Yan-hua,

GUO Ying-yuan, DING Ning, LEI Qing, YE Dan-yang

*Chinese Journal of Energetic Materials*, 2015, 23(8): 737–740

## Preparation and Thermal Properties of 4, 4'-Azo-1H-1, 2, 4-triazol-5-one Ammonium Salt



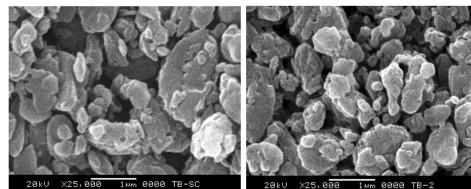
A new high-energy organic ammonium salt 4, 4'-azo-1H-1, 2, 4-triazol-5-one ammonium salt ( $\text{AZTO} \cdot \text{H}_2\text{O}$ ) was synthesized. The thermal behaviors of  $\text{AZTO} \cdot \text{H}_2\text{O}$  was studied by DSC. The Kissinger method and Ozawa method were employed to determine kinetic parameters and thermal decomposition mechanism function of  $\text{AZTO} \cdot \text{H}_2\text{O}$  in exothermic process.

XIAO Jian-xiong, DU Xiao-li, QIAO Li-yan, YAN Dong,

XU Kang-zhen, HUANG Jie

*Chinese Journal of Energetic Materials*, 2015, 23(8): 741–745

### Preparation of Micro-nano TATB by High-pressure and Ultrasonic Breaking Method

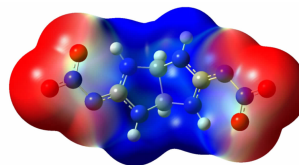


TATB particles with mean particle size of 530 nm were prepared by high-pressure and ultrasonic breaking method. The effects of breaking pressure, TATB concentration, surfactant and breaking times on the mean particle size and surface area of micro-nano TATB were studied.

ZENG Gui-yu, LIU Chun, ZHAO Lin, QIN De-xin

*Chinese Journal of Energetic Materials*, 2015, 23(8): 746–750

### Structure and Properties of 3,7-Bis(nitroimino)-2,4,6,8-tetraazabicyclo[3.3.0]octane



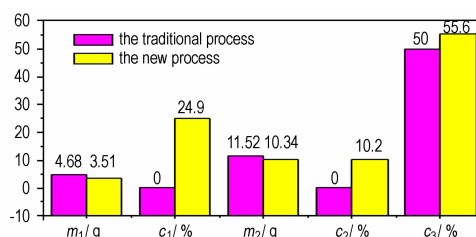
The thermal properties, the electronic structure and detonation properties of a nitrogen-rich energetic material 3,7-bis(nitroimino)-2,4,6,8-tetraazabicyclo[3.3.0]octane were investigated by the TG-DTG-DSC method and the quantum chemical method, respectively. It can be used as a potential candidate of high-energy and stable energetic material.

JIN Xing-hui, HU Bing-cheng, GAO Si-jing,

WANG Chang-ying, LIU Zu-liang, Lü Chun-xu

*Chinese Journal of Energetic Materials*, 2015, 23(8): 751–754

### Process of Vacuum Oxidation Crystallization During Producing RDX by Direct Nitration

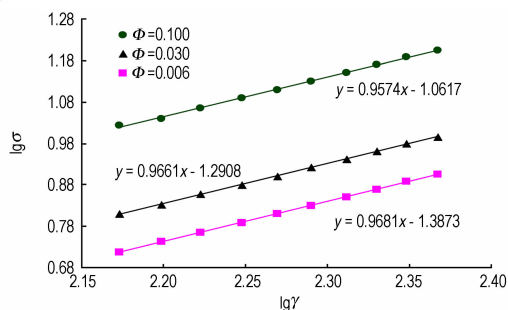


The vacuum oxidation crystallization process was applied to the preparation of RDX by a direct nitration method, which effectively solved the problem of a large amount of waste acid produced in the direct nitration. The optimum process conditions were investigated by a single factor method.

XU Qian, YE Zhi-wen, Lü Chun-xu

*Chinese Journal of Energetic Materials*, 2015, 23(8): 755–759

### Effect of Phosphatidylcholine on the Rheological Properties of HTPB-Styrene Solution



Effect of phosphatidylcholine on the rheological properties of HTPB-styrene solution was studied by viscometric method. The viscosity changing factor ( $|C|$ ) was used to characterize the degree of molecular interaction between phosphatidylcholine and hydroxyl-terminated polybutadiene (HTPB). The blending behavior of phosphatidylcholine and HTPB in mixed solution system was further discussed.

XIE Xiao, LU Hong, WANG Yun, LUO Guan

*Chinese Journal of Energetic Materials*, 2015, 23(8): 760–765

### Identification of Uniaxial main Characteristic Failure Parameter on TATB-based PBX

TANG Wei, YAN Xi-lin, LI Ming, WEN Mao-ping, LIU Tong, ZHANG Ding-guo

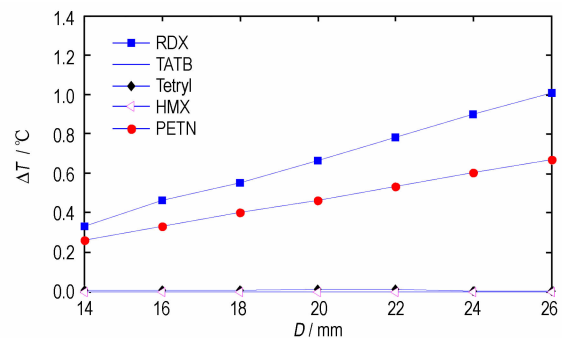
*Chinese Journal of Energetic Materials*, 2015, 23(8) : 766–770

A series of uniaxial tension and compression-induced direct failure tests, and also failure after creep tests under different initial stresses, were designed within the temperature range of 20–50 °C on a type of TATB-based PBX. Based on the acquired failure data, effect of environment temperature and initial creep stress on the failure stress and strain were analyzed.

### Numerical Simulation on Internal Temperature Field of Explosive Cylinders during Accelerated Aging Test

SUN Xin-li, HUANG Gui, ZHAO Yu-chun

*Chinese Journal of Energetic Materials*, 2015, 23(8) : 771–775

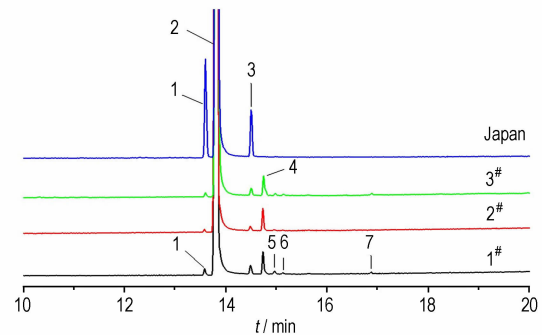


Thermal decomposition effects on internal temperature field of explosive cylinders during accelerated aging test was investigated by theoretical analysis and finite element simulation.

### Determination of the Composition and Purity of JP-10 by Gas Chromatography/Mass Spectrometry

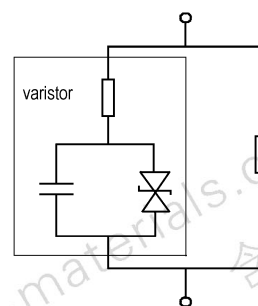
LI Yan-ling, JI Ke-jian, LIU Yuan-jun, GAO Di, GAO Yan-li, ZHAO Xiao-gang

*Chinese Journal of Energetic Materials*, 2015, 23(8) : 776–780



Components of JP-10 were analyzed by gas chromatography/mass spectrometry (GC/MS), and the purity was determined by external standard method with GC/MS.

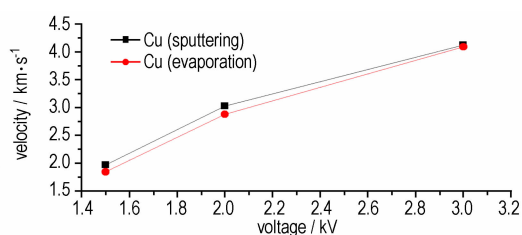
### Electro-explosive Performances of SCB Igniter with Varistor



Varistor, as used for electrostatic or radio frequency (RF) protection of semiconductor bridge (SCB) igniters, should not affect the SCB inherent properties. Therefore, two kinds of experiments are adopted to study the variation of the firing time and the firing-required energy.

DU Pei-kang, TAN Ming, LI Yong, ZHOU Bin, WANG Jun  
*Chinese Journal of Energetic Materials*, 2015, 23(8): 781–786

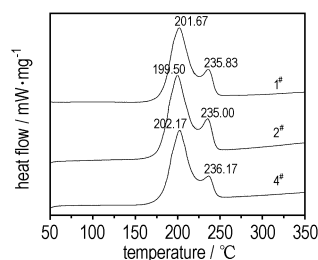
### Effects of Fabrication Process on Drive Capability of Flyer with Copper Bridge Foil



X-ray diffraction was applied to analyze the structure of copper film deposited by e-beam evaporated deposition and magnetron sputtering. The exploding bridge foil was fabricated with photolithography. The velocity of the flyer under different voltage were investigated by physical vapor deposition to study the ability of flyer driven by exploding bridge film. The up-and-down method was implemented to analyze the threshold exploding energy of hexanitrostilbene-IV, which was successfully initiated by flyer.

GUO Fei, FU Qiu-bo, WANG Yao, WANG Meng,  
 HUANG Hui, SHEN Rui-qi  
*Chinese Journal of Energetic Materials*, 2015, 23(8): 787–790

### Thermal Decomposition and Combustion Performance of Modified High-Energy TEGN Propellant



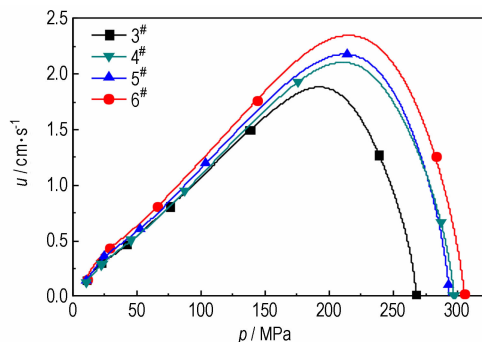
The thermal decomposition characteristics and combustion performance of high-energy TEGN propellant that containing RDX and TPUE was analyzed by differential scanning calorimetry (DSC) and closed-bomb. The combustion mechanism of high-energy TEGN propellant was analyzed and the interrupted burning surfaces was observed by 3D microscope.

XUE Huan, HE Wei-dong, XU Han-tao  
*Chinese Journal of Energetic Materials*, 2015, 23(8): 791–795

### Influence of Fluoride Functional Additives on the Combustion Performance of Gun Propellant

TIAN Cui-hua, XIAO Zheng-gang

*Chinese Journal of Energetic Materials*, 2015, 23(8): 796–801



TiO<sub>2</sub>-fluorinated acrylate functional additives were synthesized via reaction of titanium dioxide nanoparticle and fluoride monomer. Gun propellant particles were prepared by blending functional additives and triethylene glycol dinitrate (TEGDN) double-base propellant pills and the experiment of gun propellant was performed by a closed bomb.

### Experimental Study on Influence of Composition on Mechanical Properties of Fuel-rich Composite Propellants

Tarek M Elhedery, LIANG Guo-zhu

*Chinese Journal of Energetic Materials*, 2015, 23(8): 802–806

The influence of composition on mechanical properties of fuel-rich composite propellants based on hydroxyl-terminated polybutadiene pre-polymer (HTPB)/ammonium perchlorate oxidizer (AP)/aluminum fuel (Al) was experimentally investigated.

### Energy Characteristics of Solid Propellant Containing 5-Amino-tetrazolium Nitrate (5-ATEZN)

DU Xu-jie, LI Xiao-dong, LI Shu-kui, ZOU Mei-shuai,  
YANG Rong-jie, LI Yu-chuan, PANG Si-ping

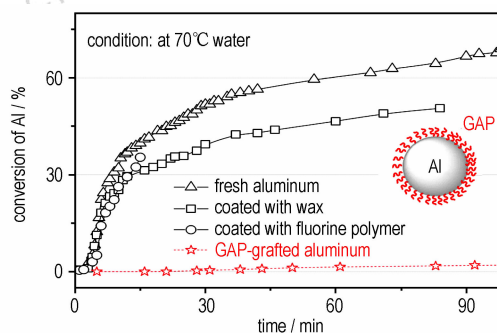
*Chinese Journal of Energetic Materials*, 2015, 23(8): 807–812

Energetic characteristics for monopropellant, HTPB propellant and GAP propellant containing 5-amino-tetrazolium nitrate (5-ATEZN) were calculated and analyzed based on the principle of free energy minimization.

### Properties of Ultrafine Aluminum Powders Modified by Facile Grafting with Glycidyl Azide Polymer

LIU Xiao-bing, PAN Li-ping, ZHANG Jian-hu, GONG Fei-yan

*Chinese Journal of Energetic Materials*, 2015, 23(8): 813–816



The ultrafine aluminum powders with diameter of 1–2 μm were surface grafted by energetic glycidyl azide polymer (GAP) using diisocyanate as bridge via consecutive condensation reactions between —OH and —N=C=O groups. The surface properties, compatibility with fluorine polymeric binders as well as the resistance to water oxidation of the prepared GAP-grafted aluminium powders were studied.

Executive editor: JIANG Mei WANG Yan-xiu ZHANG Qi