

**Thermal Decomposition Kinetics of GI-920 Explosive**

GAO Da-yuan, HE Song-wei, SHEN Yong-xing, ZHOU Jian-hua  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 1–4

The thermal decomposition processes of PETN and GI-920 explosives were studied by DSC-TG at heating rates of 5, 10 and 20 K · min<sup>-1</sup>, respectively. The thermal decomposition kinetic parameters and the mechanism function of PETN and GI-920 explosives were obtained by Ozawa's method and the integral isoconversional non-linear method.

**Thermal Behaviors of Aluminum Nano-Particles Fast Reaction with Propylene Oxide**

YAN Zheng-xin, GUO Chang-li, CHANG Lin, GUO Ming-huan, HU Dong  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 5–8

The thermal behaviors in the incident shock waves of aluminum nano-particles reaction with propylene oxide were studied. The ignition delay time of aluminum nano-particles was experimentally investigated by spectral technology. The reacting temperature was determined to be 3189 K with  $AIO(B^2\Sigma^+ - X^2\Sigma^+)$  strength obtained by the calibrated ICCD. The morphology of the products was studied by the scanning electron microscopy.

**Thermodynamic Properties of Potassium Salts of Trinitrophenol**

LI Ling-hui, ZHANG Tong-lai, ZHANG Jian-guo, SUN Cui-na  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 9–11

The specific heat capacity of substituted potassium salts of 2,4,6-trinitro-1,3,5-trihydroxybenzene (TNPG) was measured by a differential scanning calorimeter (DSC) and fitted to the polynomial equation in the experimental temperatures. The change of enthalpy and entropy were calculated.

**Influence of Humidity on Thermal Decomposition Behavior of Single-base Propellant**

ZHANG Ren-he, LU Gui-e, LIU Kun-lun, DENG Han-bo, CHEN Han-qing  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 12–15

The thermal decomposition behaviors of single-base propellants stored with different humidity were studied by using microcalorimetry with sealed and open glass test-tube.

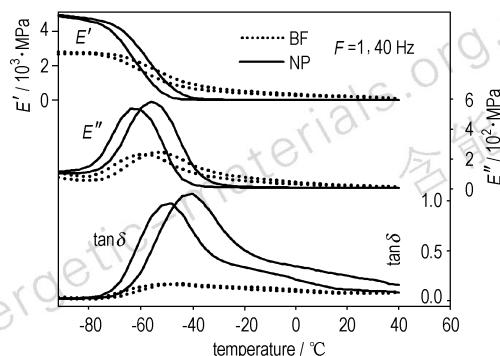
**Behavior of Non-isothermal Crystallization of DNTF(II): Crystallization Kinetics in RDX**

ZHOU Wen-jing, LIU Zi-ru, ZHANG Gao, KANG Bing, LU Hong-lin  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 16–18

The non-isothermal crystallization of DNTF in RDX was studied by DSC, and the behaviors of non-isothermal crystallization of DNTF in RDX and HMX were compared.

### Dynamic Mechanical Properties of NEPE Propellant with Minimum Signature and its Binder Film

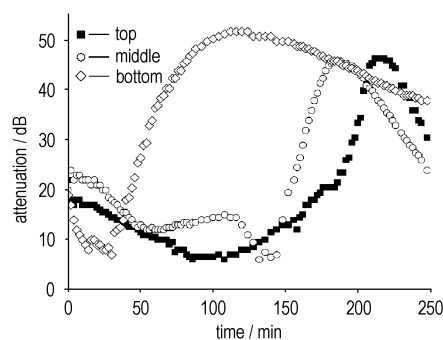
ZHANG Wei, LI Xu-li, LIU Zi-ru, FAN Xue-zhong  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 19–22



The dynamic mechanical characteristics of NEPE propellant with minimum signature and its binder film were measured by dynamic mechanical analyzer. The  $\tan \delta$  (loss tangent) curves of the propellant and its binder film consist of  $\alpha$  and  $\beta$  relaxations, and the magnitudes of  $\tan \delta$  and  $E''$  (loss modulus) of two relaxation processes of the propellant are higher than those of the binder film because of addition of nitramine in propellant.

### Ultrasonic Monitoring in Explosive Cast Process

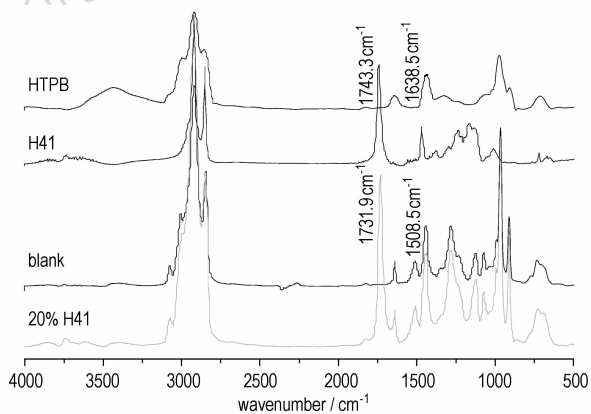
TIAN Yong, LIU Shi, ZHOU Hong-ping, ZHANG Wei-bin,  
 YANG Zhan-feng, LUO Guan  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 23–25



The ultrasonic parameters and their changes were studied in explosive cast process using ultrasonic transmission testing. The representative characteristics and quality abnormality such as crack were obtained.

### Morphology and Mechanical Properties of Hyperbranched Polyester/HTPB Polyester IPN

SONG Xue-jing, LUO Yun-jun, CHAI Cun-peng,  
 LI Guo-ping  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 26–28

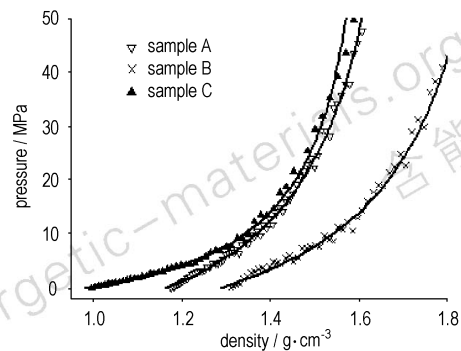


IR was used to characterize chemical structures of HTPB, hyperbranched polyester (HBPE), HTPB polyurethane and HBPE/HTPB polyurethane IPN.

### Application of Kawakita Equation in Compression of Energetic Crystalline Particles

TAN Wu-jun, LI Ming, HUANG Hui

*Chinese Journal of Energetic Materials*, 2008, 16(1): 29–33



Two recrystallized and a commercial grade RDX and HMX crystal particles were selected and tested by compressive stiffness method. The Kawakita equation was applied in fitting the compressive curves.

### PBX Creep Model Based on Modified Time Hardening Theory

TANG Wei, LI Ming, WEN Mao-ping, ZHANG Qiu, ZHAO Xiao-dong

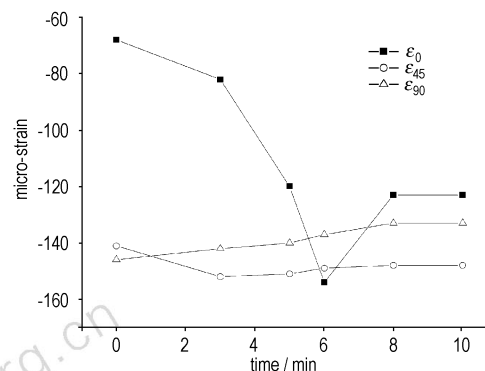
*Chinese Journal of Energetic Materials*, 2008, 16(1): 34–36

A HMX based PBX was employed to conduct compressive creep tests. The model parameters were determined and the corresponding fitting details were discussed for validating the model. Meanwhile, finite element software was used to simulate the creep deformation of cylinder specimens subjected to the experimental stresses.

### Testing and Relieving of Residual Stress for Polymer Bonded Explosive Based on TATB

ZHOU Hong-ping, LI Jing-ming, LI Li, WEI Xing-wen, ZHANG Wei-bin, WEN Mao-ping

*Chinese Journal of Energetic Materials*, 2008, 16(1): 37–40



The initial residual stress and its distribution of polymer bonded explosive based on TATB were tested by blind-hole drilling method, and the effect of heat treatment on residual stress relaxation was studied.

### Synthesis and Characterization of Energetic Konjac Glucomannan

ZHANG Zheng-guang, LUO Xue-gang

*Chinese Journal of Energetic Materials*, 2008, 16(1): 41–43

Energetic glucomannan (EKGM) was synthesized in the mixture of fuming nitric acid, concentrated sulfuric acid and phosphoric anhydride, and was characterized by elementary analysis, FTIR, SEM, XRD and TG-DSC.

### Synthesis of Keto-RDX and its Characterizations Calculation

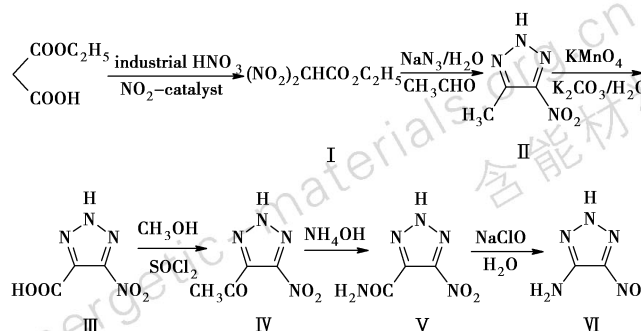
Arash Shokrollahi, Abbas Zali, Hamid Reza Pouretdal, Mohammad Hossein Keshavarz

*Chinese Journal of Energetic Materials*, 2008, 16(1): 44–48

Keto-RDX was obtained by one-step method with RDX as by-product. The effects of various parameters on high yield were studied. A simple analytical method was also introduced to determine simultaneously Keto-RDX/RDX mole ratio.

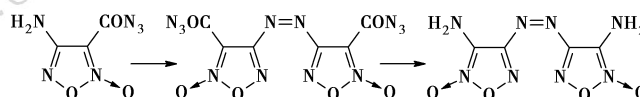
### Synthesis and Characterization of 4-Amino-5-nitro-1,2,3-triazole

HUO Huan, WANG Bo-zhou, ZHOU Cheng, XIONG Cun-liang  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 49–52



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

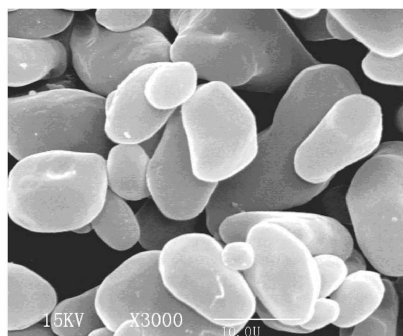
LEI Qing, HE Jin-xuan, GUO Ying-yuan, CAO Yi-lin  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 53–55



With 4-amino-3-azidocarbonylfuroxan as precursor, 3,3'-diamino-4,4'-azofuroxan (DAAFO) was synthesized by a two-step process, and the precursor 3,3'-diamino-4,4'-azo-furoxan was synthesized by a three-step process with ethyl acetoacetate as starting material.

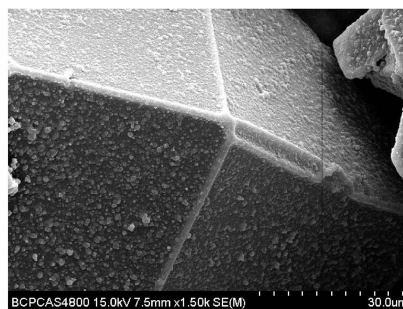
### RDX Coated with Hyantoin/Triazines Composite Bonding Agent

LI Jiang-cun, JIAO Qing-jie, REN Hui, WANG Li-xia, ZHAO Wei-dong  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 56–59



### Mechanical Properties of NEPE Propellant Containing Two Coated ε-HNIW

MENG Zheng, OU Yu-xiang  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 60–62



The surface and edges of the ε-HNIW crystal were coated by melamine-formaldehyde resin. The NEPE propellant containing the ε-HNIW coated with melamine-formaldehyde resin showed the best mechanical property.

### Selective Nitration of Toluene in Presence of Potassium Dihydrogen Phosphate

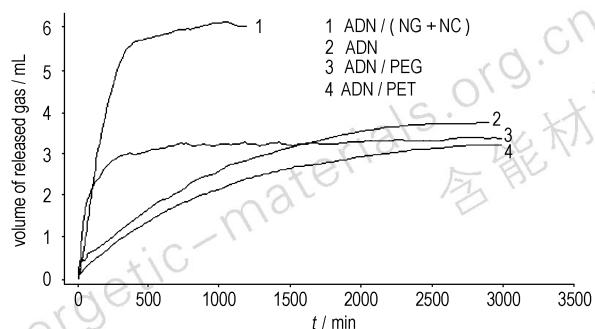
LIU Li-rong, Lü Chun-xu, ZHANG Xiao-bo  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 63–65

Catalytic activities of potassium dihydrogen phosphate for nitrations of toluene were studied. Effects of catalyst dosage, reaction condition and recovered catalyst on the regioselectivities of toluene were investigated.

### Compatibilities of ADN with Five Kinds of Binders

YUE Pu, HENG Shu-yun, HAN Fang, ZHANG La-ying,  
HE Shao-rong

*Chinese Journal of Energetic Materials*, 2008, 16(1): 66–69

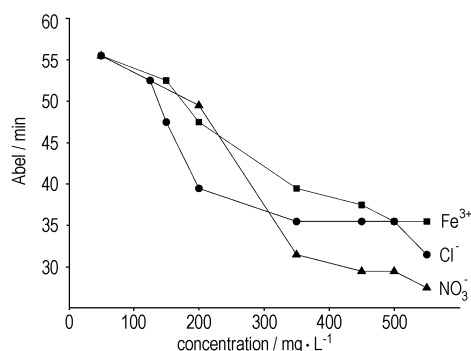


The compatibilities of some kinds of the binders with ADN were studied by DSC, VST and LAWA.

### Influence of Impurity on Stability of Blend Nitrate Ester and Energetic Binder

WANG Zhong-he, QU Xiao-hong, QIAO Xiao-peng,  
ZHANG Xiao-jun

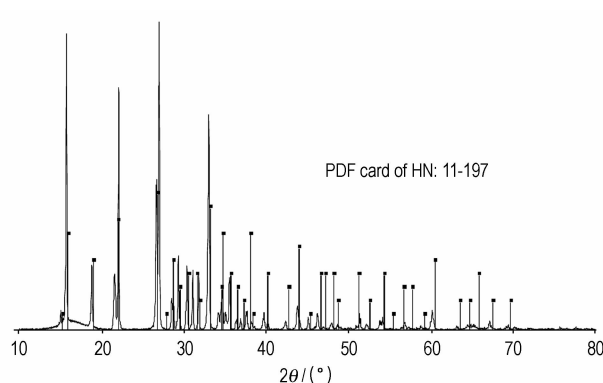
*Chinese Journal of Energetic Materials*, 2008, 16(1): 70–72



### Crystal Structure of Hydrazine Nitrate

XIA Yun-xia, SUN Jie, MAO Zhi-hua, HONG Zhou,  
KANG Bin

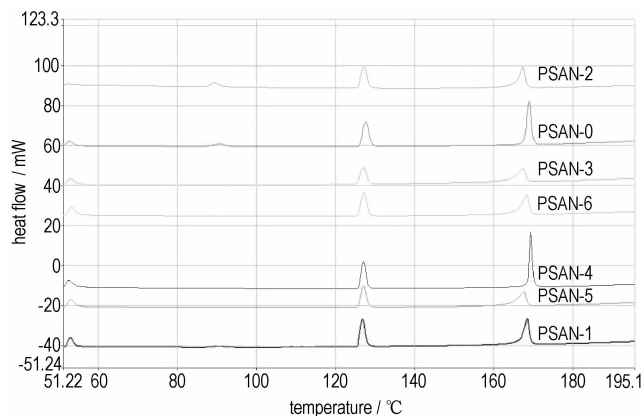
*Chinese Journal of Energetic Materials*, 2008, 16(1): 73–76



### Effects of Polymers on Phase Transition of Ammonium Nitrate

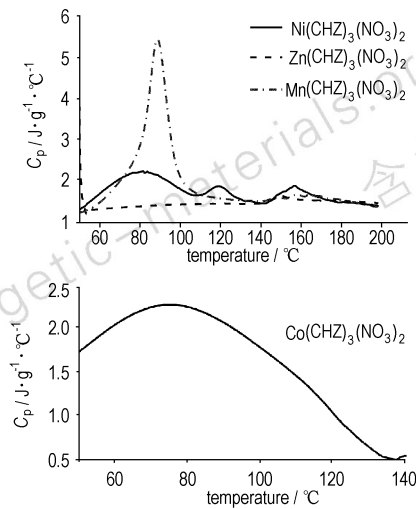
YE Fang-qing, ZENG Gui-yu, Lü Chun-xu, HUANG Hui

*Chinese Journal of Energetic Materials*, 2008, 16(1): 77–79



The effects of polymer additives on AN polymorphs were studied by adding 0.99% (wt%) six kinds of polymer in AN samples and using differential scanning calorimetry (DSC) method.

**Specific Heat Capacity of Carbohydrazide Nitric Acid  
Energetic Coordination Compounds**



The specific heat capacities of four carbohydrazide nitrate energetic coordination compounds  $[M(CHZ)_3](NO_3)_2$ , ( $M = Mn, Co, Zn, Ni$ ) were determined by differential scanning calorimeter in a temperature range lower than 200 °C.

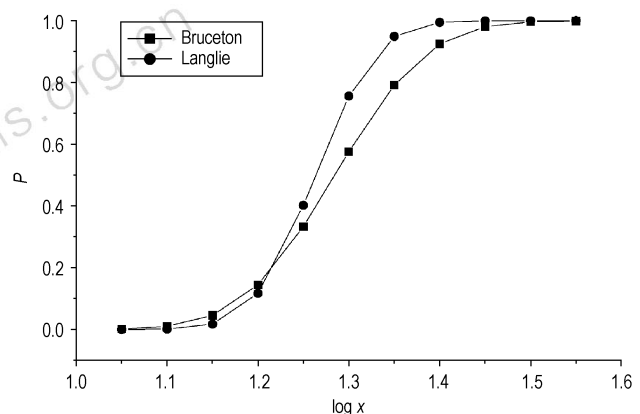
QIAO Xiao-jing, FAN Fan, SHI Shao-mei, SUN Cui-na  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 80–82

**Electrostatic Spark Sensitivity of Single Base Oblate  
Propellant with Micropores**

LIN Xiang-yang, DUAN Hong-zhen, PAN Ren-ming,  
YIN Ji-gang  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 83–85

The electrostatic spark sensitivity of oblate propellant with micropores was studied by adjusting the distance of discharging and the way of loading.

**Comparison Study on Langlie Method and Up-and-down  
Method for Sensitivity Test of Explosive**



YUAN Jun-ming, ZHANG Qing-ming, LIU Yan  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 86–89

The experimental data of up-and-down method and Langlie method were obtained and were fitted into two fire probability curves respectively when the initial estimates were accurate in the first set.

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**QSPR Study of Correlation between Impact Sensitivity of *m*-Nitroaromatics and Electrotological State Indices**

WANG Rui, JIANG Jun-cheng, PAN Yong, CAO Hong-yin  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 90–93

Electrotological state indices for atomtype (ETSI) was used to characterize the structure of *m*-nitrobenzenes. A model with 4 variables was established about the correlation between the impact sensitivity and ETSI.

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**Energetic Characteristics Calculation of a New Generation of High Energy Solid Propellant**

LIU Jing-ru, LUO Yun-jun, YANG Yin  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 94–99

Based on analyzing characteristics of five kinds of energetic materials including nitroethylnitramine (NENA), hexanitrohexaazaisowurtzitane (CL-20), furazan compounds, zole nitrogen-rich compounds and hydrogen storage alloy, energetic level of NEPE solid propellant composed of normal (or energetic) binder/energetic plasticizer/high energy density material/metal incendiary agent was calculated with the code based on the minimum free energy method. Eight methods to obtain the high energy propellant were supplied.

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**Engineering Calculation on Threshold Velocity of Covered Explosives Impacted by Tungsten Projectile**

FU Hua, TAN Duo-wang, LI Tao, LI Jin-he  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 100–102

Based on the one-dimensional energy criterion of explosives shock initiation, considering the shock propagation of projectile impacting covered explosives, the relation formula of threshold velocity was obtained between tungsten and steel in the same size, and were simulated.

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**Research Progress of Clean Nitration of Aromatic Compounds**

FANG Dong, SHI Qun-rong, GONG Kai, LIU Zu-liang, Lü Chun-xu  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 103–112

Recent advances of clean nitration of aromatic compounds, including liquid-phase nitration with solid acid, nitration in liquid acid/nitrate salt system, vapor-phase nitration with solid acid, liquid-phase nitration with Lewis acid, nitration in ionic liquid system, was reviewed.

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**Recent Developments in Predicting Impact and Shock Sensitivities of Energetic Materials**

Mohammad Hossein Keshavarz, Arash Shokrolahi, Karim Esmailpoor, Abbas Zali, Hamid Reza Hafizi, Jamshid Azarniamehraban  
*Chinese Journal of Energetic Materials*, 2008, 16(1): 113–120

Some recent developments in predicting sensitivity by various methods was reviewed and discussed for various classes of energetic materials.