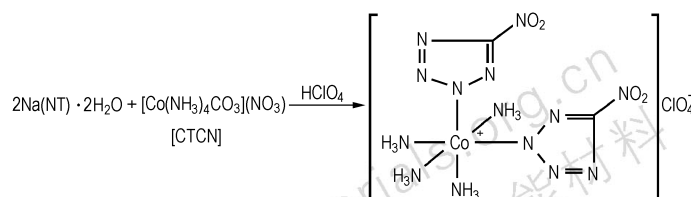


### Development of a New-generation Primary Explosives Designing and Synthesis

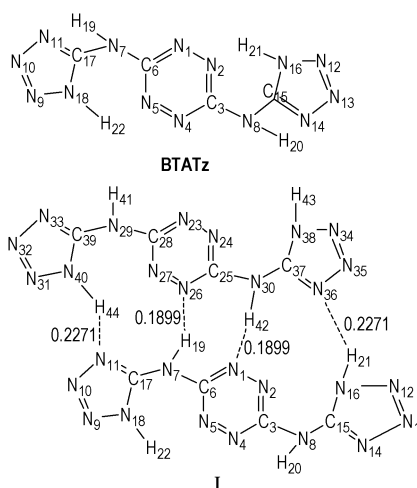


Nitrogen-rich heterocycle compounds are new generation primary explosives. They have excellent initiating and firing properties and environment friendship. The research key point is to design and synthesize the intermediates or ligands of nitrogen-rich heterocycle, nitrogen-rich heterocycle ligand complex compounds as well as their salt forms.

SHENG Di-lun, ZHU Ya-hong, PU Yan-li

*Chinese Journal of Energetic Materials*, 2012, 20(3): 263–272

### Theoretical Study on Intermolecular Interactions of 3,6-Bis(1H-1,2,3,4-tetrazol-5-yl-amino)-1,2,4,5-tetrazine Dimers

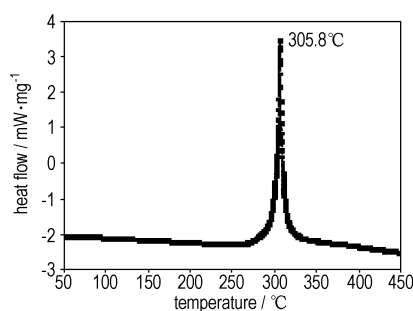


Six optimized stable 3,6-bis(1H-1,2,3,4-tetrazol-5-yl-amino)-1,2,4,5-tetrazine (BTATz) dimers were found on the potential energy surface and their electronic structures have been obtained by using density functional theory (DFT) at the B3LYP/6-31G\* level, and the intermolecular interaction energy was calculated with basis set superposition error correction (BSSE) and zero point energy (ZPE) correction. The natural bond orbital (NBO) analysis was performed to reveal the origin of the interaction.

HU Yin, SHAO Ying-hui, HU Rong-zu,  
SONG Ji-Rong, MA Hai-xia

*Chinese Journal of Energetic Materials*, 2012, 20(3): 273–279

### Thermal Behavior of Tetraethylammonium Dodecahydrododecaborates (BHN) and Its Compatibility with Main Components of Propellant

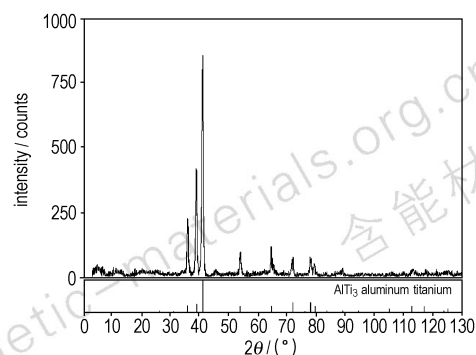


Thermal behaviors of BHN were investigated by DSC and TG-DTG techniques. The compatibilities of BHN with some energetic materials and inert components were examined by DSC method as well as vacuum stability test.

PANG Wei-qiang, XUE Yun-na, FAN Xue-zhong,  
XU Hui-xiang, SHI Xiao-bing, LI Yang,  
LI Yong-hong, WANG Xiao-fei

*Chinese Journal of Energetic Materials*, 2012, 20(3): 280–285

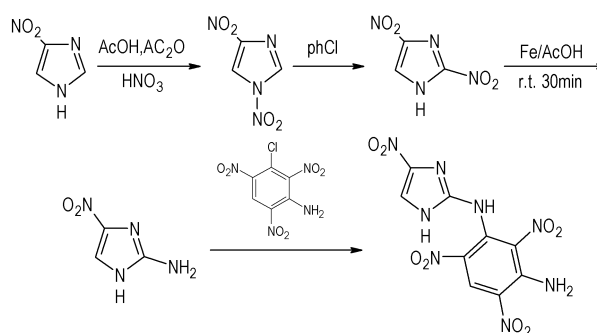
### Nanoparticles of TiAl Alloy Prepared by Flow-levitation Method



Nanoparticles of TiAl alloy with  $Ti_3Al$  phase were prepared by flow-levitation method. The temperature of the droplet has an effect on the phase constituent and particles size.

LUO Jiang-shan, LI Xi-bo, TANG Yong-jian, SHU Yuan-jie  
*Chinese Journal of Energetic Materials*, 2012, 20 (3): 286–288

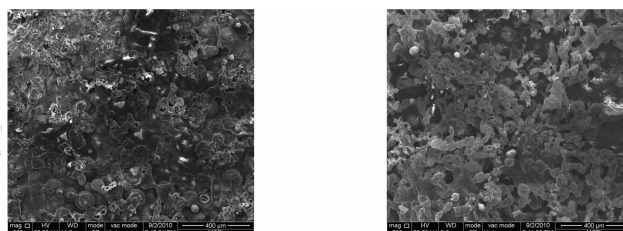
### Synthesis and Thermal Behavior of 2-Amino-4-nitroimidazole and its Derivative



2-Amino-4-nitroimidazole was synthesized using 4-nitroimidazole as starting materials, followed by nitration thermal rearrangement and selective reduction. The condensation of 2-amino-4-nitroimidazole with 3-chloro-2,4,6-trinitrobenzenamine led to obtain 2-(3-amino-2,4,6-trinitro)phenylamino-4-nitroimidazole.

HOU Ke-hui, LIU Zu-liang, ZHANG Hua-yan, CHENG Jian  
*Chinese Journal of Energetic Materials*, 2012, 20 (3): 289–291

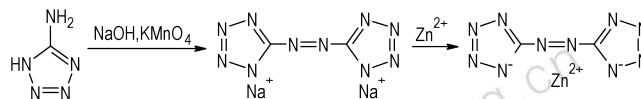
### Properties of RDX-CMDB Propellants Containing Guanidinium Azotetrazolate (GZT)



Characteristics of RDX-CMDB propellants containing guanidinium azotetrazolate (GZT) were investigated and combustion behaviors of RDX-CMDB propellants containing GZT with or without copper and lead organic salts were explained basing on analysis of the thermal interactions between components of propellants and GZT and studying the quenched surfaces of propellants.

WANG Qiong, LIU Xiao-gang, Ji Yue-ping, FAN Xue-zhong,  
WEI Hong-jian, WANG Han, ZHANG Lin-jun  
*Chinese Journal of Energetic Materials*, 2012, 20 (3): 292–296

### Synthesis and Characterization of Zinc 5,5'-Azotetrazolate

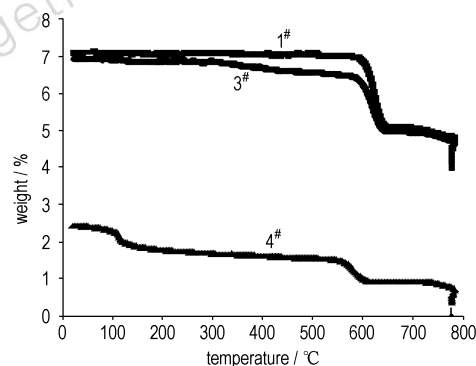


Zinc 5,5'-azotetrazolate was synthesized with the solution of Zn<sup>2+</sup> and sodium 5,5'-azotetrazolate (NaATZ) which was prepared by 5-aminotetrazole as a starting materials. The sensitivities to heat, impact, flame and electrostatic sensitivity were investigated.

SUN Yan-ling, YAN Dong-lin, ZHU Shun-guan,  
ZHANG Lin, MA Peng

*Chinese Journal of Energetic Materials*, 2012, 20(3): 297–301

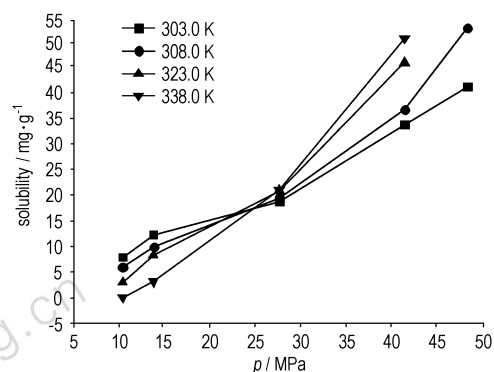
### Effects of Epoxy Resin and Graphite on Impact Sensitivity of KClO<sub>4</sub>-type Pyrotechnics Composite



Effects of adhesive and graphite on impact sensitivity of KClO<sub>4</sub>-type pyrotechnics composite were studied by impact sensitivity instrument, TG-DTA and SEM.

HAO Qing-wei, BA Shu-hong, SUN Zhen-xing, ZHANG Zhe  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 302–305

### Solid-Liquid Equilibrium of TNT/RDX/CO<sub>2</sub> Ternary System under Supercritical Conditions

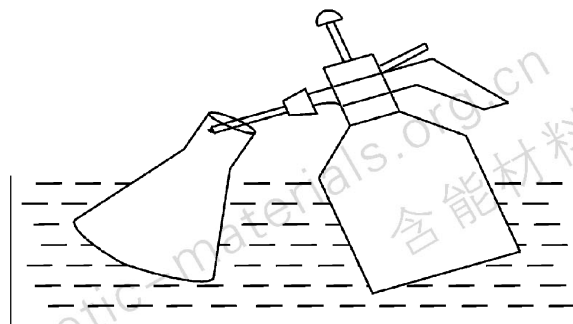


The solid-liquid equilibrium data for TNT and RDX in supercritical carbon dioxide (SC-CO<sub>2</sub>) were measured at different temperature and pressure by UV-Vis. The effects of pressure, temperature and support effect (*SE*) between molecules of RDX and TNT on the solubility of TNT/RDX/SC-CO<sub>2</sub> system were analyzed.

Ji Wen-su, DING Yu-kui, ZHANG Huai-zhi,  
LI Jin-ming, LI Hui-ming

*Chinese Journal of Energetic Materials*, 2012, 20(3): 306–309

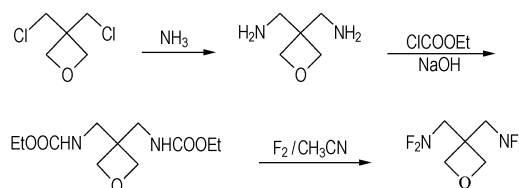
### Reducing Water Content in PGDN/DBS Solution by Spraying Method



Using spraying method to reduce the water content in PGDN(1,2-propanediol dinitrate)/DBS (dibutyl sebacate) mixed solution in lab scale, the Influence of pressure, spraying times, materials temperature and ventilation condition were investigated.

BI Jing, ZHANG Xiao-hong, WANG Zhong-he, ZANG Le-dan  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 310–313

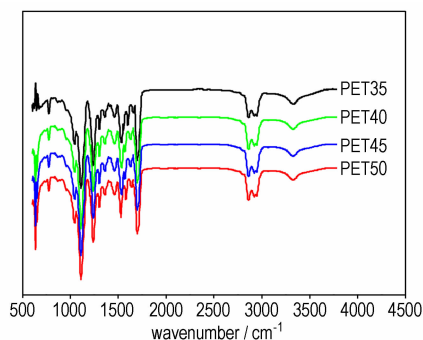
### Property and Characterization of 3,3-Bis(difluoroaminomethyl)oxetane



3,3-Bis(difluoroaminomethyl)oxetane (BDFAO) was synthesized from 3,3-bis(chloromethyl)oxetane (BCMO) and was characterized by IR,  $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, GC and elemental analysis. The thermal properties of synthesized BDFAO were investigated by TG-DTA(thermogravimetry and differential thermal analysis). Its sensitivities were determined by GJB772A–1997.

ZHANG Ming-quan, LIU Hong-yu, GAO Bao-zhu,  
ZHANG Lei, KANG Ling, ZHANG Ke-ren  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 314–318

### Morphology and Dynamic Rheological Behaviors of Thermoplastic Polyurethane Based on HQEE as Extender



A series of nitroester plastisized segmented thermoplastic polyurethane elastomers (TPU) based on tetrahydrofuran-ethylene oxide copolyether (PET) as the soft segments and 1,3-bis(isocyanatomethyl)benzene (XDI) extended with hydroquinone-bis( $\beta$ -hydroxyethyl) ether (HEQQ) as the hard segments was synthesized. The microphase separation of TPU and its dynamic rheological behaviors were studied.

JIANG Hai, YANG Xu-ping, YANG Wen-bin,  
HUANG Hui, LI Shang-bin  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 319–323

### Uncertainty Analysis of Combustion Heat Test for Boron Powder Under Combustion-supporting Condition

ZHANG Qin-Lin, LOU Xu-jun, YU Tian-xing,  
ZHAO Xin-peng, WANG Ying-hong

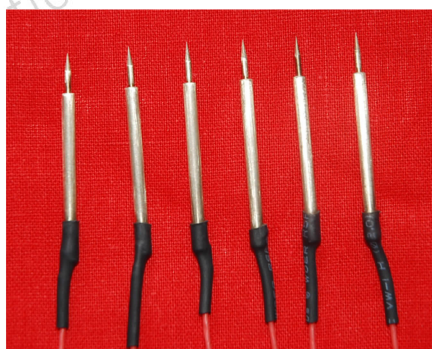
*Chinese Journal of Energetic Materials*, 2012, 20(3): 324–328

The uncertainty analysis show that the temperature rise of the calorimetric system, the calorific value of combustion-supporting agent, and the mass of boron powders involved in the combustion, are three principle factors affecting the uncertainty of the combustion heat test of boron powder under the combustion-supporting condition

### A Precision Experimental Method of Measurement Detonation Velocity

SUN Yong-qiang, HE Zhi, WANG Jun

*Chinese Journal of Energetic Materials*, 2012, 20(3): 329–332

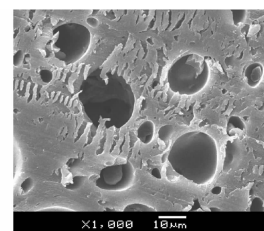
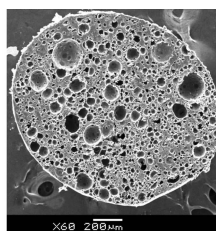


The needle shape probe and corresponding experiment method are designed to measure the precision steady detonation velocity. Results show that the uncertainty of detonation velocity in IHE based on TATB measurement using this electrical pins is not exceed  $19 \text{ m} \cdot \text{s}^{-1}$ , and the relatively uncertainty is not exceed 0.25%.

### Preparation of Micro-pores Oblate Spherical Powder with Closed-pore Structure by Improvement of One Step Process

GUO Chang-ping, YIN Ji-gang, YUAN Chao,  
LI Sheng-you, PAN Ren-ming

*Chinese Journal of Energetic Materials*, 2012, 20(3): 333–336

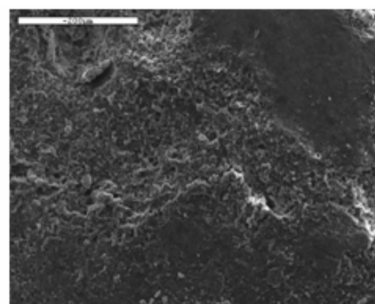


Changing the dosage of inner water phase and chemical foaming are used to prepare MOSP with closed-pore structure.

### Combustion Characteristics of Nitramine Propellant Containing FOX-12

WEI Lun, YAO Yue-juan, LIU Shao-wu,  
ZHENG Shuang, ZHANG Yuan-bo, GAO Lin-rong

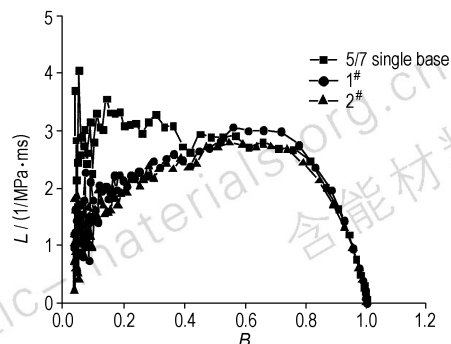
*Chinese Journal of Energetic Materials*, 2012, 20(3): 337–340



The thermal decomposition and combustion characteristics of nitramine propellants containing FOX-12 were studied by DSC-TG, a closed bomb and an interrupted-burning testing instrument. The surface structure of the nitramine propellants containing FOX-12 was characterized by electron microscopy.

### Combustion Performance of Modified Single Base Gun Propellant Prepared by Solvent Extraction Process

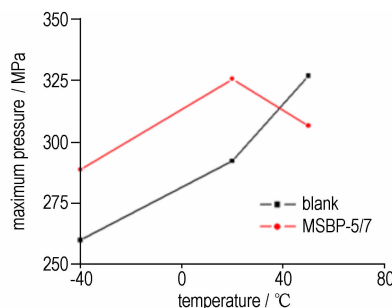
LI Da, LIU Shao-wu, YU Hui-fang, LIU Bo,  
HAN Bin, YAO Yue-juan, WEI Lun, WANG Feng  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 341–344



The modified single base gun propellant was prepared via the energy-increased and desensitized process to the 5/7 single base gun propellant. The combustion performances of the modified single base gun propellant were determined by a closed bomb.

### Temperature Coefficient of the Modified Single-based Propellant

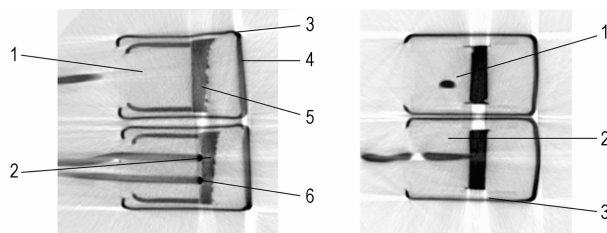
LIU Shao-wu, LIU Bo, WANG Qiong-lin,  
WANG Feng, YU Hui-fang, LI Da  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 345–348



The modified single-based propellant, prepared by the “impregnated-deterred-coated” technology has the advantage of low temperature coefficient when used in the 857-30 mm gun. The combustion and interior ballistic performances of the propellant were investigated by closed-bomb and 857-30 mm gun.

### Performance Determination and Structure Reinforced Design of Detonator in High Acceleration Overload Environments

AO Cheng-gang, REN Wei, BAI Ying-wei, SHANG Hong-zao  
*Chinese Journal of Energetic Materials*, 2012, 20(3): 349–354



X-Ray CT chromatogram of detonator before and after structure reinforced design, with the impact of 100000 g and about 100  $\mu$ s. The results show that structure reinforced detonator basic structure nearly do not change, its performance against high acceleration overload is enhanced.

### Prediction Method of No-firing Current of Electric Explosive Device Based on RBF Neural Network

CUI Wei-cheng, LIU Lin-mi, MENG Fan-lei

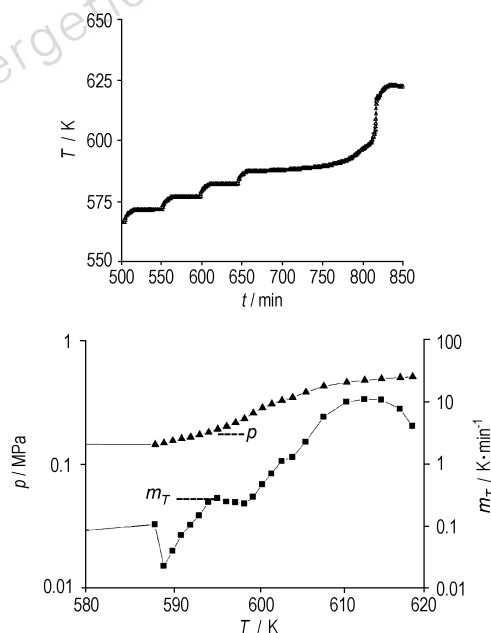
*Chinese Journal of Energetic Materials*, 2012, 20(3): 355–358

The heat loss coefficient measured with the non-destructive transient pulse test system was redeemed using the no-firing current measured by the Bruceton method, then the no-firing current of the electric explosive device was predicated using the radial basis function (RBF) neural network.

### Thermal Hazard Analysis of White-light Firework mainly Composed of Barium Nitrate

JIANG Hui-ling, SUN Bin

*Chinese Journal of Energetic Materials*, 2012, 20(3): 359–363

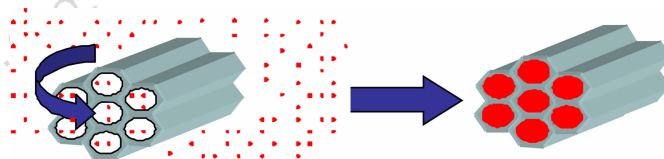


The adiabatic reaction processes of dry and wet white-light fireworks mainly composed of barium nitrate were studied by an accelerating rate calorimeter (ARC). The curves of change in adiabatic reaction temperature with time and in temperature rise rate with temperature were obtained.

### Applications of Ordered Nanoporous Materials in Energetic Materials

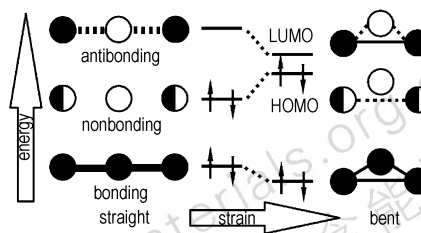
YANG Rong-ji, CAI Hua-qiang, HUANG Hui,  
NIE Fu-de, GUAN De-bin

*Chinese Journal of Energetic Materials*, 2012, 20(3): 364–370



This paper comprehensively reviewed current research activities in ordered nanoporous materials, including silicon, silica, alumina, carbon, polymer and metal organic frameworks (MOFs), for their applications to energetic materials in catalysis, sorption, separation, detection, chemical sensor, nanocomposition, and so on.

### Progress of Mechanochemistry in Energetic Materials

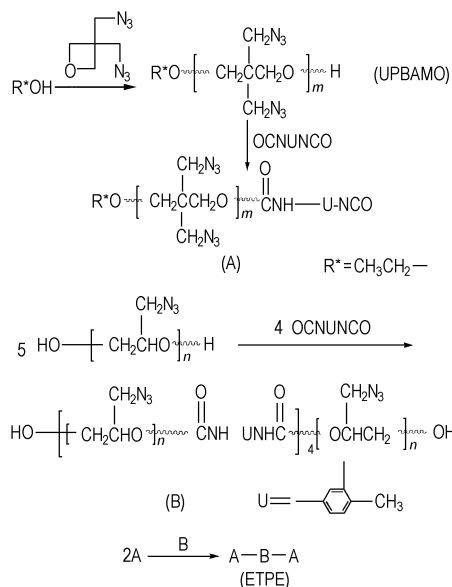


The origination and basic features of mechanochemistry were briefly introduced. Applications of mechanochemistry in the research field of energetic materials were discussed. The development prospect of the mechanochemistry of energetic materials was prospected.

LI Tie-cheng, YANG Li, LI Zhi-min, ZHANG Tong-lai

*Chinese Journal of Energetic Materials*, 2012, 20(3): 371–379

### Synthesis of ABA Tri-block ETPE Based on PBAMO/GAP

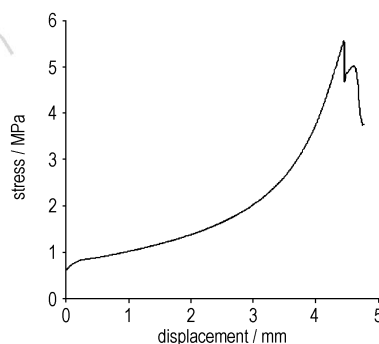


LU Xian-ming, MO Hong-chang, LI Jian-kang,

YAO Yi-lun, LI Lei, LI Na

*Chinese Journal of Energetic Materials*, 2012, 20(3): 380–381

### The Elastic Cushion Brazilian Test of PBX



The stress-displacement curve for the elastic cushion Brazilian test is valid and there is the only a main crack at the loading zone for the failure of sample.

PANG Hai-yan, LI Ming, WEN Mao-ping, LAN Lin-gang

*Chinese Journal of Energetic Materials*, 2012, 20(3): 382–383

Executive editor: WANG Yan-xiu; JIANG Mei

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