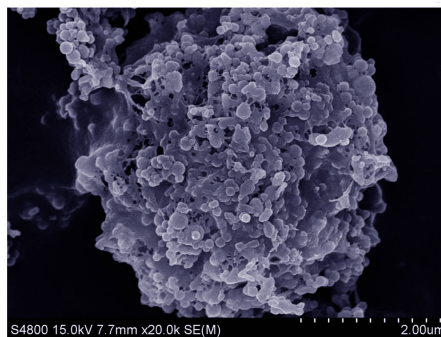


## Micropropulsion Characteristics of Nanothermites

Prepared by Electrospray

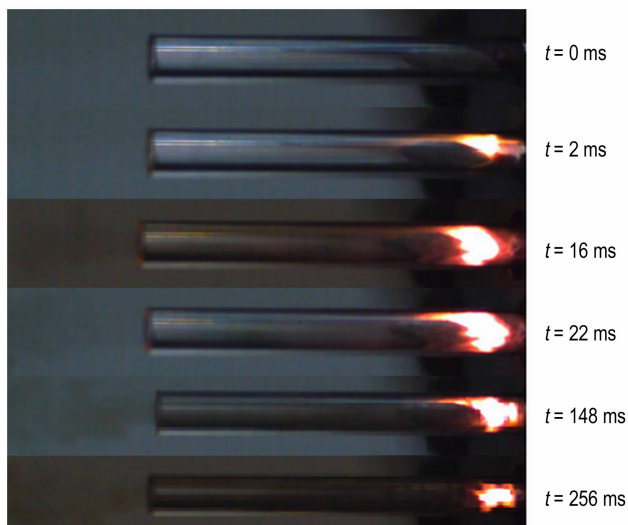
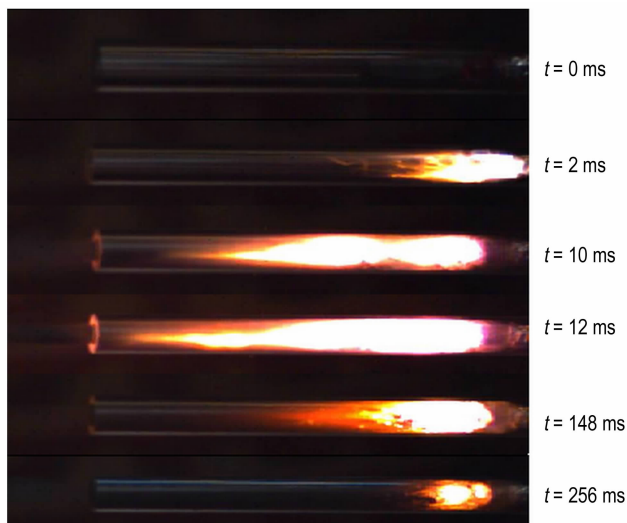


RU Cheng-bo, WANG Fei, XU Jian-bing, DAI Ji, SHEN Yun,  
YE Ying-hua, ZHU Peng, SHEN Rui-qi

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1136–1144

The micro propulsion characteristics of nanothermite, which act as the propellant of solid propellant microthrusters array, prepared by electro-spray process were measured by micro impulse testing stand and predicted by CEA. The effects of energetic binder and equivalence ratio on the performance were investigated in details.

## Analysis on Moisture Absorption and Ignition Failure of Fuel-rich Propellant Containing Magnesium-Aluminum



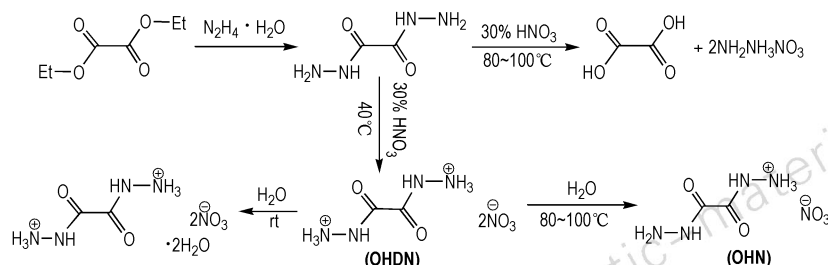
SUN Ya-lun, REN Hui, JIAO Qing-jie, HUANG Hai-long

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1145–1150

The component, thermal decomposition rule and ignition performance at atmospheric pressure of fuel-rich propellant were tested. The failure mechanism of an aerospace type of magnesium-aluminum fuel-rich propellant was analyzed.

## Synthesis and Crystal Structure of Oxalyldihyrazinium

### Dinitrate

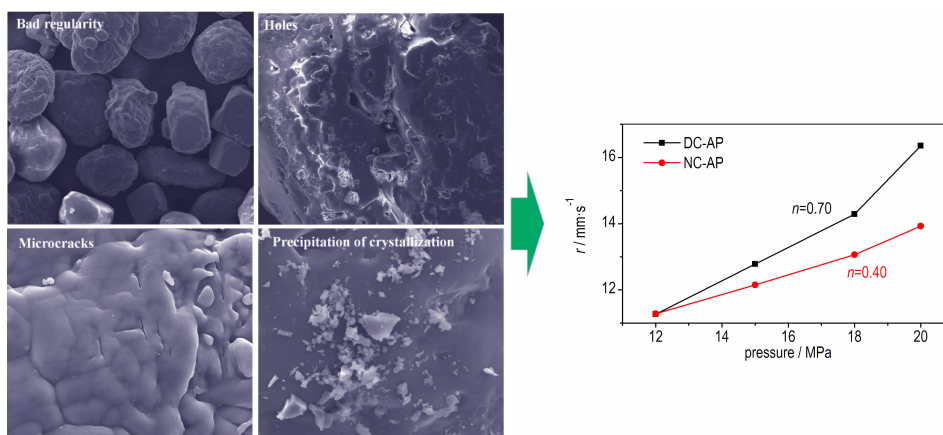


Oxalyldihyrazinium dinitrate (OHDN) was synthesized using diethyl oxalates and hydrazine hydrate as starting materials, which exhibits poor stability at high temperature and formed oxalyldihyrazinium nitrate (OHN). In addition, the single crystal of  $\text{OHDN} \cdot 2\text{H}_2\text{O}$  was firstly obtained and fully analyzed.

JIA Si-yuan, WANG Bo-zhou, BI Fu-qiang, ZHANG Jia-rong,  
WANG Min-chang

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1151–1155

## Effect of Crystal Morphology of Ammonium Perchlorate on the Properties of HTPB Propellant



ZHU Li-xun, LIU Jin-xiang, LIANG Bei, CHEN Jian-jun,  
YAN Wu-qi, LIAO Xin

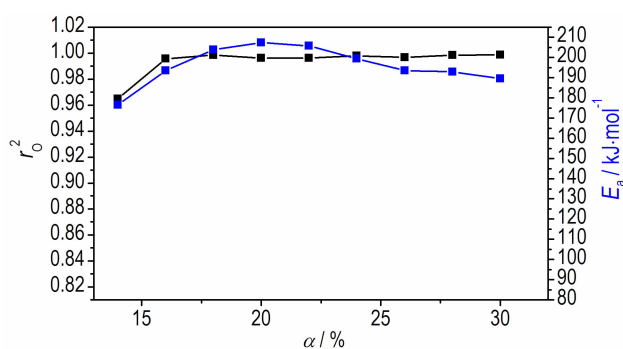
*Chinese Journal of Energetic Materials*, 2016, 24(12): 1156–1160

AP with defective crystal morphology can obviously affect the burning rate and pressure exponent of HTPB propellant at high pressure (12–20 MPa).

## Safety Properties and Non-isothermal Kinetics of Energetic Pb(II) Complex of ANPyO

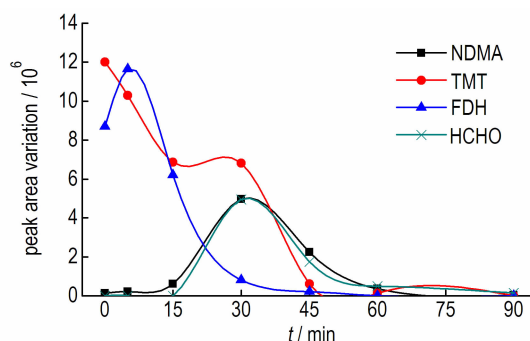
CHENG Jian, LIU Zu-liang, LI Zhen-ming, WANG Ming-xian,  
LI Li-xia, XU Zhi-xiang, ZHAO Feng-qi, XU Si-yu,  
HAO Yao-gang, SU Hong-ping

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1161–1167



Energetic Pb(II) complex of 2,6-diamino-3,5-dinitropyridine-1-oxide was synthesized. Its structure, mechanical sensitivity, thermal decomposition characteristic parameters were characterized.

### Degradation of Unsymmetrical Dimethylhydrazine Waste Water by Hydrogen Peroxide Enhanced UV-Ozone Process

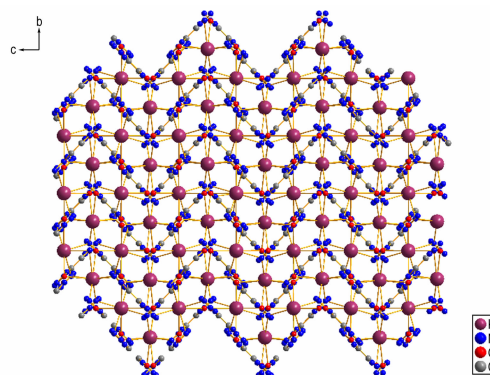


A  $\text{H}_2\text{O}_2$ -UV- $\text{O}_3$  reaction system was established to oxidize the UDMH waste water. Using the removal efficiencies of UDMH and COD as detection indexes, the main factors affecting the reaction and the optimal technological conditions were determined. The degradation efficiencies of  $\text{O}_3$  system, UV- $\text{O}_3$  system, UV- $\text{H}_2\text{O}_2$  system and  $\text{H}_2\text{O}_2$ -UV- $\text{O}_3$  system were compared. The variation law of intermediate products was explored.

XU Ze-long, ZHANG Li-qing, ZHAO Bing, WANG Ying, WU Yi

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1168–1172

### Crystal Structure and Properties of a Novel Green Initiation Explosive Dipotassium 5, 5'-bis( tetrazole-1-oxide)

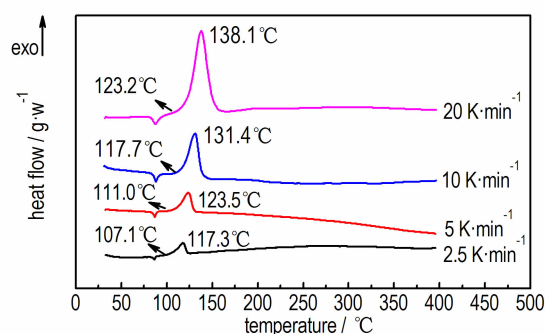


A novel green initiating explosive dipotassium 5, 5'-bis( tetrazole-1-oxide) has been synthesized. Its structure was firstly obtained and characterized by X-ray single crystal diffraction, and the properties were also studied.

ZHANG Zhi-bin, YIN Lei, LI Tong, QIN Jian, YIN Xin, ZHANG Jian-guo

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1173–1177

### Synthesis and Thermal Properties of Tetranitroacetimidic Acid (TNAAC)

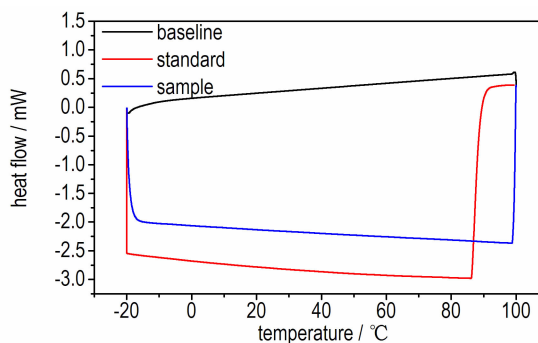


A high oxygen-containing oxidizer ( $\Omega_{\text{CO}_2} = 30\%$ ), tetranitroacetimidic acid (TNAAC), was synthesized by the nitration reaction of 1, 1'-diamino-2, 2'-nitroethylene (FOX-7) and the organic solvent extraction. The kinetic and thermodynamic parameters of thermal decomposition reaction of TNAAC were calculated.

HUANG Xiao-chuan, GUO Tao, WANG Zi-jun, LIU Min, QIN Ming-na, QIU Shao-jun

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1178–1182

### Thermal Decomposition Behavior and Thermodynamic Properties of 3, 3'-Diamino-4, 4'-azoxyfuran

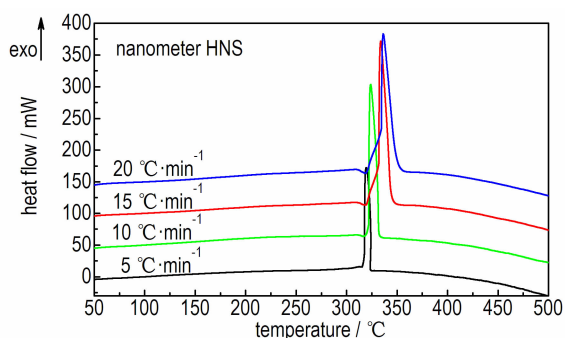


Thermal decomposition behavior of DAOAF was studied by TG-DTG/DSC and the activation energy and pre-exponential factor of DAOAF were calculated. The specific heat capacity was determined by differential scanning calorimetry. According to the relationship between specific heat capacity and thermodynamic functions, its enthalpy, entropy, Gibbs free energy increments from 253 K to 373 K, relative to the standard temperature 298.15 K, were calculated.

HE Nai-zhen, SUO Zhi-rong, GUO Rong, ZHANG Yong, LIU Ru-qin

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1183–1187

### Thermal Decomposition Performance of Nano HNS Fabricated by Mechanical Milling Method



Nanometer HNS explosive with average particle size of 94.8 nm was prepared by a high energy ball milling method. The characteristics and analyses of the HNS sample were performed by SEM, XRD, IR spectroscopy, XPS, DSC-IR analysis and 5 s explosion temperature.

SONG Xiao-lan, WANG Yi, LIU Li-xia, AN Chong-wei, WANG Jing-yu, ZHANG Jing-lin

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1188–1192

### Effects of Nano-/micrometer RDX Particle Gradation on the Property of PBX

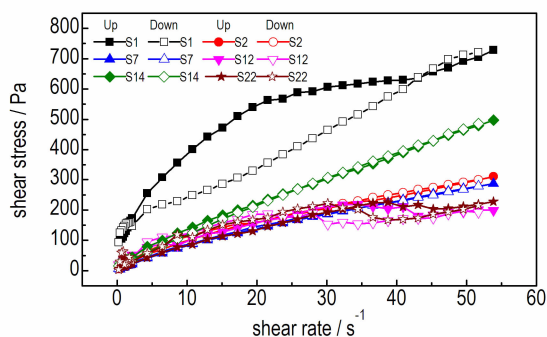


By the solution-water slurry technique, PBXs with different micrometer/nano-RDX particle gradations were prepared. The apparent morphology was observed with an optical microscope, and the mechanical sensitivity, mechanical property and detonation velocity were measured.

XIAO Lei, LIU Jie, HAO Ga-zi, KE Xiang, GAO Han, RONG Yuan-bo, LIU Qiao-e, JIANG Wei

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1193–1197

### Effects of RDX Gradation on the Thixotropy of Aldol Based Polymer Bonded Explosive

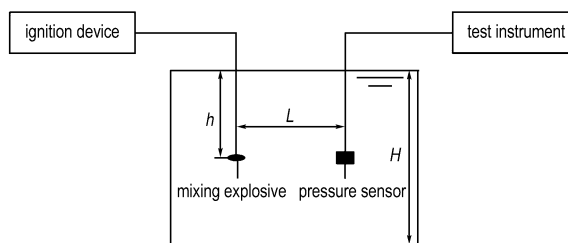


LIU Hui-hui, ZHENG Shen-sheng, CAI Jia-lin,  
JIANG Quan-ping, LUO Guan, LI Shang-bin

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1198–1204

The effect of RDX gradation and content of RDX particles on the thixotropic properties of the slurry was explored by a thixotropic loop method. The area of hysteresis loop was used to characterize the thixotropic extent.

### Effect of Boron-containing Hydrogen-storage-alloy ( $Mg(BH_x)_y$ ) on the Explosion Energy of Nitric Ester Explosive

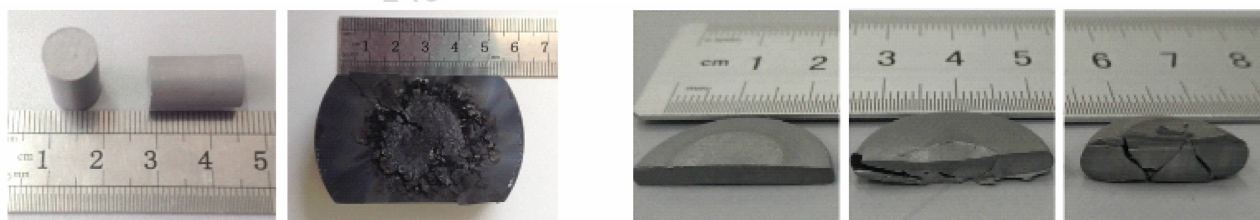


ZHANG Guan-yong, WEI Xiao-an, DU Ping

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1205–1208

$Mg(BH_x)_y$  was added into the nitric ester explosive to improve the energy. Through explosion test in air, the detonation process of the mixing explosive was studied. Through underwater explosion test, the explosion energy and the afterburning effects of the mixing explosive were investigated.

### Effect of Sintering Temperature, Ratio and Particle Size on the Reaction of Al-Teflon under Quasi-static Compression



FENG Bin, FANG Xiang, LI Yu-chun, WANG Huai-xi,  
DONG Wen

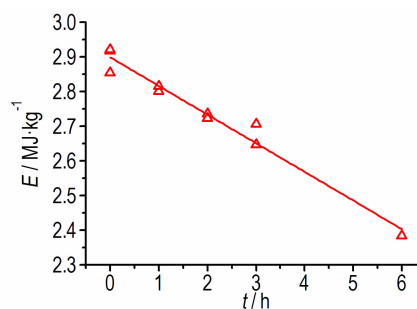
*Chinese Journal of Energetic Materials*, 2016, 24(12): 1209–1213

The influence of sintering temperature, mass fraction and particle size on the reaction phenomenon of Al-Teflon under quasi-static compression was investigated through quasi-static compression test. Different reaction and deformation phenomenon of test specimens are shown.

### Effect of Water-bath Heating on the Explosion Power of Emulsion Explosive

LIN Mou-jin, LIU Chang, MA Hong-hao, WANG Fei,  
WANG Pei-pe

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1214–1218

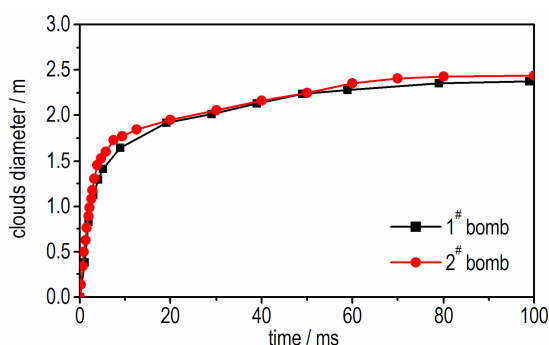


The environment temperature of protected emulsion explosive in high temperature blast hole were simulated by 100 °C water bath heating and the underwater explosion parameters were calculated and obtained through underwater explosion experiments.

### Composite Interference Performance of Chopped Carbon Fiber Clouds to Millimeter Wave and Infrared

LIU Zhi-long, WANG Xuan-yu, DONG Wen-jie,  
SUN Wen-xuan, BAI Hai-tao

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1219–1224



The experimental platform to test and analyze the interference performance of chopped carbon fiber (CF) clouds to millimeter wave and infrared, was built. The 1.5 mm and 4 mm CF explosion dispersion experiment was carried out under the static wind condition. The process of forming explosion dispersion clouds was investigated. The interference performances of clouds to 3 mm wave, 8 mm wave and 8–14 μm infrared were measured and analyzed.

### Research Progress of MOFs as Combustion Catalysts and High Energy Additives for Solid Propellants

YANG Yan-jing, ZHAO Feng-qi, YI Jian-hua, XUAN Chun-lei,  
LUO Yang

*Chinese Journal of Energetic Materials*, 2016, 24(12): 1225–1232

Research progresses of metal organic framework (MOFs) in heterogeneous catalysis and energetic materials were systematically introduced. Considering that designing and synthesizing the efficient MOFs catalyst used in solid propellant combustion, exploring the reaction mechanism of MOFs in combustion process of propellant, revealing the effect of composition, structure of energetic groups and coordination modes with metal ions on the energy performance of MOFs may be the research focus in the future.

Executive editor: WANG Yan-xiu ZHANG Qi JIANG Mei