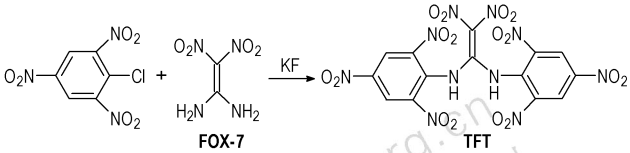
Synthesis and Property Prediction of 1,1-Bis(picrylamino)-2,2-dinitroethylene

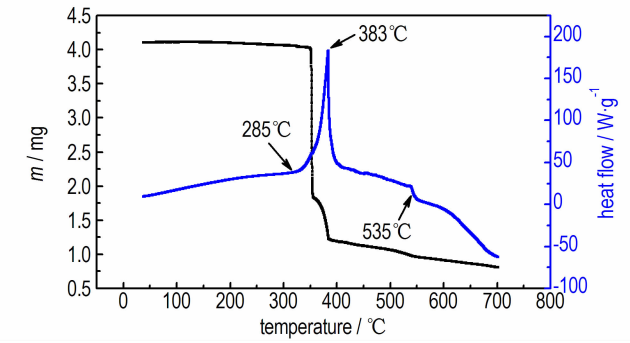


1,1-Bis(picrylamino)-2,2-dinitroethylene(TFT) was synthesized using 2,4,6-trinitrochlorobenzene and 1,1-diamino-2,2-dinitroethylene(FOX-7) as raw materials and KF and imidazole as catalysts by condensation and its structure was identified by IR, NMR and MS. Its thermal stability was analyzed by DSC and the theoretical density of TFT after optimizing was predicted by Monte-Carlo method.

JIA Ya-nan, SHEN Cheng, WANG Peng-cheng, LU Ming

Chinese Journal of Energetic Materials,2016,24(6): 523－527

Synthesis and Thermal Decomposition of a Heat-resistance Explosive Potassium Salts of 5,5′-Bistetrazole-1,1′-diolate

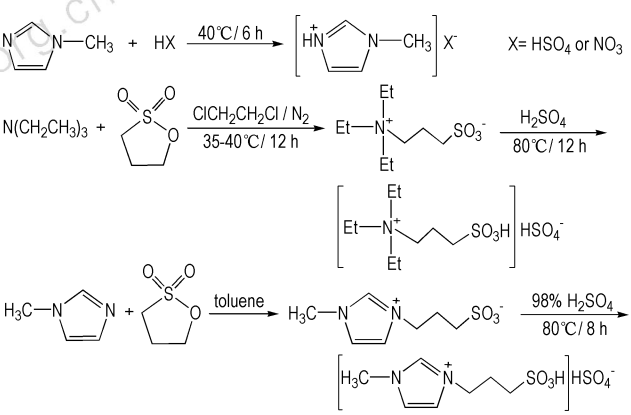


Potassium 5,5′-bistetrazole -1,1′-diolate(PBTOX) was synthesized by using glyoxime as starting materials. The structure of PBTOX was characterized. Its thermal behavior was studied by DTA-TG. The surface morphology and mechanical properties of PBTOX crystal were determined by atomic force microscopy(AFM) and Lorentzian contact resonance(LCR) imaging technique.

WANG Xiao-jun, ZHANG Xiao-peng, SHANG Feng-qin, LU Zhi-yan, MA Xiao, TAN Xiao-yan, JIN Shao-hua

Chinese Journal of Energetic Materials,2016,24(6): 528－531

Aldehydic-amide Condensation Reaction to Synthesize Multi-nitrogen Heterocyclic Compounds Catalyzed by Acidic Ionic Liquids

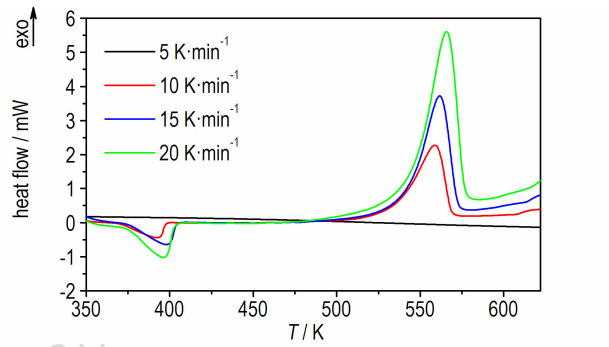


A novel acidic ionic liquid (IL) [C_3SO_3HDoim]HSO_4 was designed and synthesized as the catalyst for condensation reaction of aldehyde and amine, which are multi-nitrogen heterocyclic compounds. The recycling performance of [C_3SO_3HDoim]HSO_4 was also investigated.

ZHOU Zhi-lei, WANG Peng-cheng, LU Ming

Chinese Journal of Energetic Materials,2016,24(6): 532－537

Thermal Decomposition Kinetics of Metal Salts of 1,1′-Dihydroxy-5,5′-bitetrazole

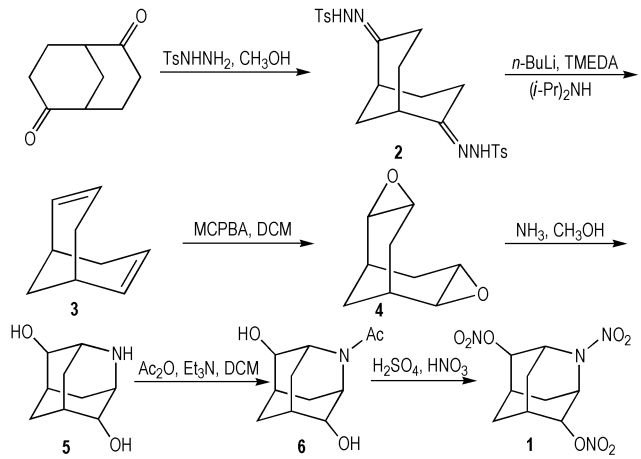


The apparent activation energy (E_K and E_O) and pre-exponential factor (A_K) for thermal decomposition reaction of 1,1′-BTOCu were calculated by Kissinger's and Ozawa's method. The kinetic parameters and mechanism functions of thermal decomposition reaction were presented.

WANG Jie-qun, WANG Peng-cheng, LU Ming

Chinese Journal of Energetic Materials, 2016, 24(6): 538–543

Synthesis and Characterization of 2-Nitro-2-azaadamantane-4,8-diyl Dinitrate

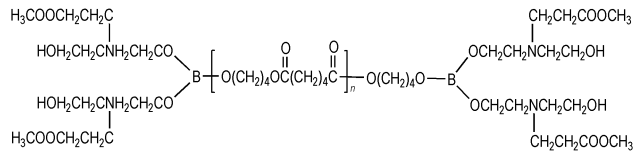


2-Nitro-2-azaadamantane-4,8-diyl dinitrate was synthesized from bicyclo[3.3.1]nonane-2,6-dione. The optimal nitration reaction conditions was obtained and the thermal stability of target product was studied by thermogravimetry (TG) and differential scanning calorimetry (DSC). The detonation properties were predicted by Kamlet-Jacobs formula.

RUAN Hong-wei, LING Yi-fei, WANG Gui-xiang, LUO Jun

Chinese Journal of Energetic Materials, 2016, 24(6): 544–549

Synthesis and Application of Modified Borate Ester Bonding Agent for HTPB Propellant

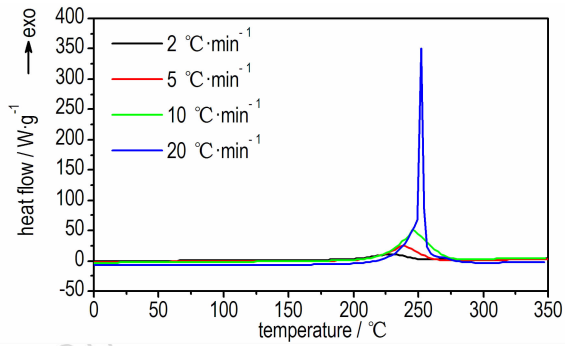


A modified borate ester bonding agent was synthesized using *N*,*N*-dihydroxyethyl-3-amino methyl propionate as the external connection monomer, polybutylene adipateas as interconnection monomer, and tributyl borate as material to improve the mechanical properties of a four-component hydroxy-terminated polybutadiene propellant.

LIU Miao-e, ZHANG Xi-long, DENG Jian-ru

Chinese Journal of Energetic Materials, 2016, 24(6): 550–554

Thermal Decomposition Kinetic Study of Azido-terminated Glycidiyl Azide-polymer

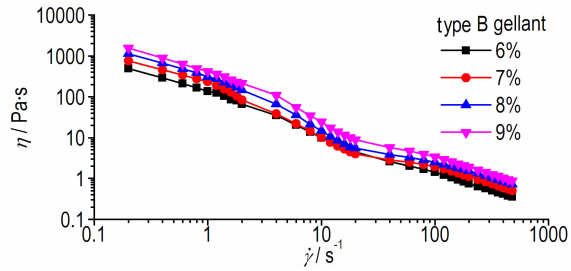


DONG Jun, OU Jiang-yang, ZHU Lin, LI Bin

Chinese Journal of Energetic Materials, 2016, 24(6): 555–559

The apparent activation energy, pre-exponential factor and thermal decomposition kinetic equation were studied at heating rates of 2 ℃ · min^{-1}, 5 ℃ · min^{-1}, 10 ℃ · min^{-1} and 20 ℃ · min^{-1}. Its kinetic parameters thermodynamic and thermal safety parameters were calculated.

Preparation and Performance Characterization of Paraffin Based Gel Fuel

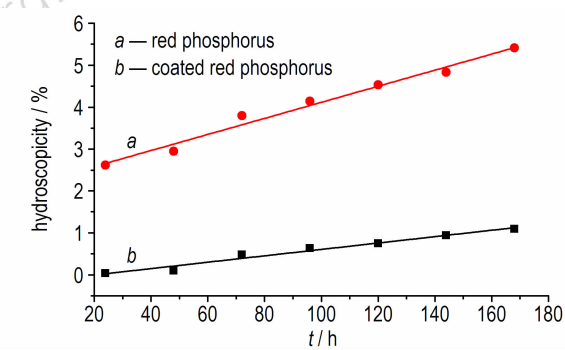


GONG Jing-zhi, FENG Feng, DENG Han-yu, CAO Qi

Chinese Journal of Energetic Materials, 2016, 24(6): 560–564

Two types of paraffin gels were prepared by using the fumed silica (type A) and modified castor oil (type B) as gellants, respectively. The influence of gelling agent type on physical stability, yield stress, viscosity and thixotropy of different gel types were investigated. The viscosity curves were fitted by using the Herschel-Bulkley (HBE) constitutive equation.

Process Research on Coating Red Phosphorus with Aluminum Hydroxide and Phenol Formaldelyde Resin

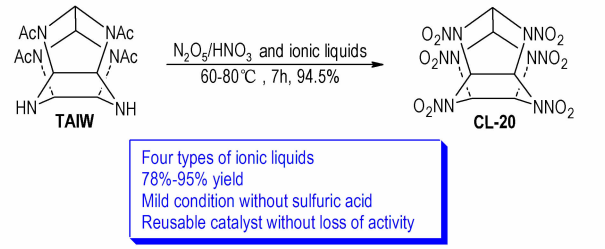


LIU Jie, GUAN Hua, SONG Dong-ming

Chinese Journal of Energetic Materials, 2016, 24(6): 565–570

To reduce the hygroscopicity of red phosphorus, the red phosphorus was coated by aluminium hydroxide/phenol formaldehyde resin. The process of preparing the coated red phosphorus was optimized by orthogonal test. The coating layer of red phosphorus was characterized by FTIR and SEM.

A Nitrolysis Method to Synthesize CL-20 with High Yield and Low Pollution

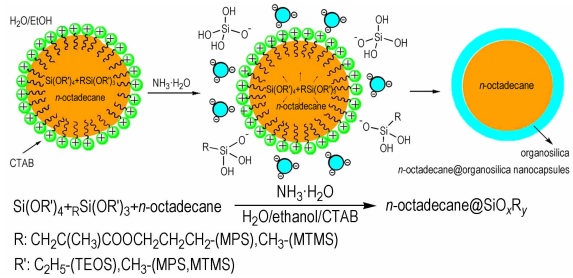


Instead of the commonly used concentrated nitric and sulfuric acid in industrial scale, new nitrification systems of N_2O_5/HNO_3/ionic liquids(ILs, quaternary ammonium salts, caprolactams, imidazoles, pyridines) were used to nitrify tetraacetyl hexaazaisowurtzitane(TAIW) to prepare hexanitro-hexaazaisowurtzitane (CL-20), which was more friendly to the environment.

DONG Bo, QIAN Hua, REN Li-ping

Chinese Journal of Energetic Materials,2016,24(6): 571-575

Nanoencapsulated Phase Change Material with Modified Organosilica Shell



A series of modified organosilica nanoencapsulated *n*-octadecane phase change materials were prepared via interfacial hydrolysis/polycondensation method of different organic silane precursors in miniemulsion. The chemical and crystallizing structure, morphology, phase change properties, and hydrophobicity of the shell materials were characterized by FT-IR, XRD, SEM, DSC and WCA measurements.

ZHU Ya-lin, LIANG Shu-en, ZHOU Yuan-lin, WANG Hui, TIAN Chun-rong, WANG Jian-hua

Chinese Journal of Energetic Materials,2016,24(6): 576-581

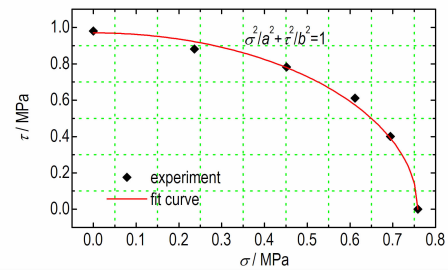
Preparation and Thermal Properties of Non-equilibrium Al/PTFE Reactive Materials

The Al-Ni-Ti-Zr non-equilibrium powder/PTFE reactive materials were prepared with Al-based mechanically alloyed non-equilibrium powders and PTFE micro powders. The phase composition and morphology characteristics of the Al-Ni-Ti-Zr powders milled for different times were characterized by XRD and SEM, respectively. The phase structure of the milled powders was characterized by high resolution transmission electron microscopy(HRTEM) and selected area electron diffraction(SAED).

PAN Jian-feng, WANG Tao, YU Yin-hu, ZHANG Du-bao

Chinese Journal of Energetic Materials,2016,24(6): 582-586

Mechanical Properties of Explosive Crystal/Binder Interface Based on Tension-shear Test

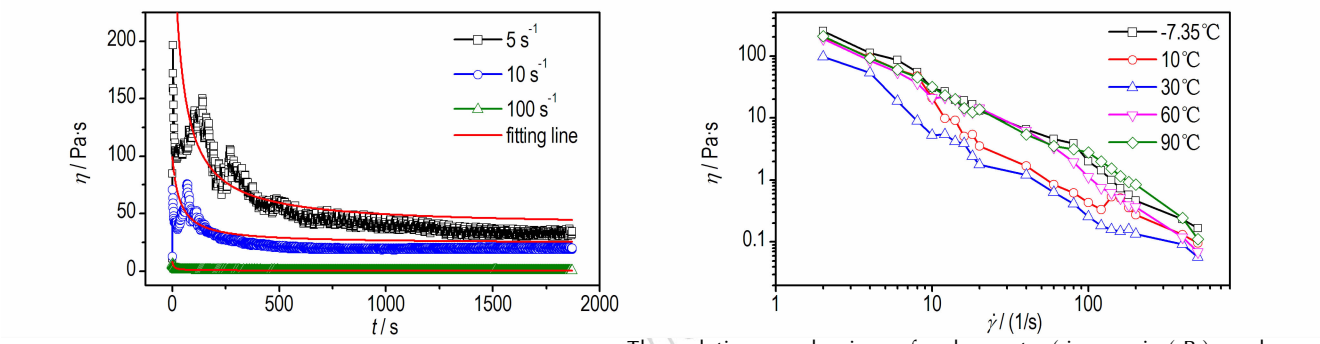


Mechanical properties of explosive crystal/binder interface in PBX were investigated by a new developed tension-shear method.

YAN Xi-lin, TANG Ming-feng, GAN Hai-xiao, WANG Lin, LI Ming, WEN Mao-ping

Chinese Journal of Energetic Materials,2016,24(6): 587-591

Time and Temperature Dependent Constitutive Equations Modeling of RP-1 Jet Fuel Gel

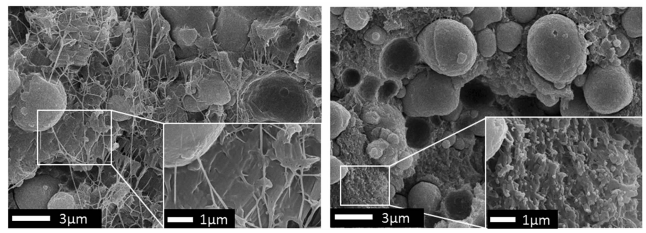


CAO Qi, FENG Feng, WU Xiao-song

Chinese Journal of Energetic Materials, 2016, 24(6): 592–598

The gelation mechanism of gel agents (inorganic (B) and organic (A)) for gelation aviation kerosene RP-1 were studied. The rheological parameters were measured by Brookfield rotational rheometer. Finally, the time independent, time dependent, and temperature dependent constitutive equations were built.

Reaction of Al-Teflon under 10^{-2} s^{-1} Compression Strain Rate

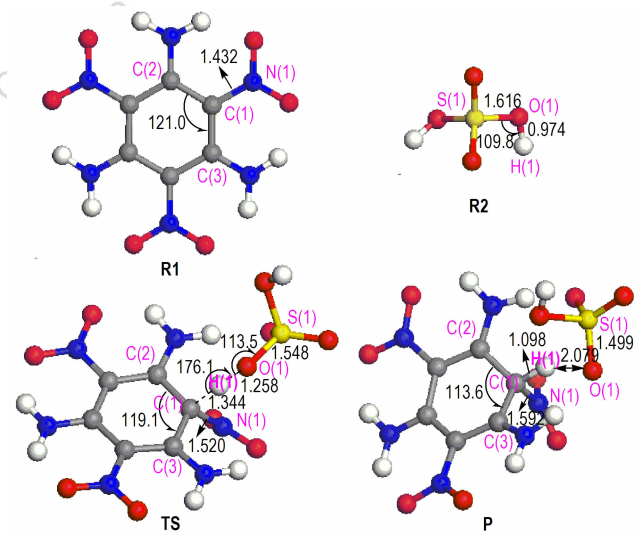


FENG Bin, FANG Xiang, LI Yu-chun, WANG Huai-xi, MAO Yi-ming

Chinese Journal of Energetic Materials, 2016, 24(6): 599–603

Two types of Al-Teflon specimens were obtained by different heat treatment processes. The reaction phenomenon of two kinds of specimens was tested via quasi-static compression test. The stress-strain curves were obtained. The measurement of density, micro morphology analysis of SEM and observations of high speed photography of specimen were performed.

Structure and Formation Mechanism of Impurity in Nano-TATB

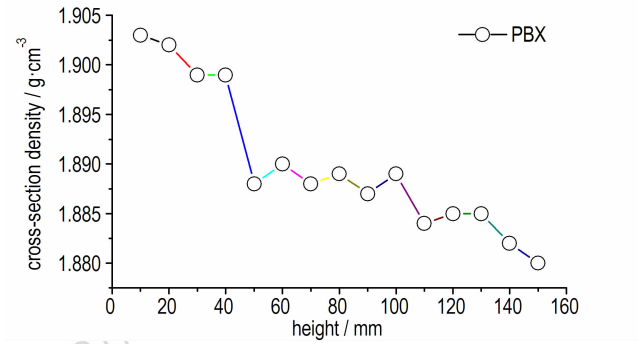


WANG Yan-qun, WANG Jun, HUANG Hui-sheng, QIAO Zhi-qiang, LI Rui, SHEN Jin-peng, YANG Guang-cheng

Chinese Journal of Energetic Materials, 2016, 24(6): 604–608

The structures of the impurities produced during preparation process of TATB were studied by liquid-state ^{13}C NMR, X-ray photoelectron spectroscopy and theoretical simulation method.

CT Test Method for the Cross-section Density Distribution of PBX Component with Complex Configuration

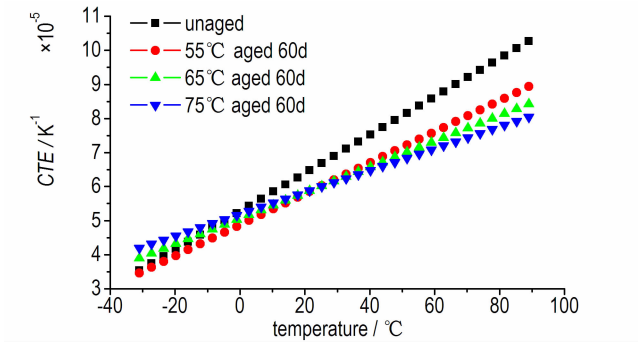


YANG Xue-hai, ZHANG Wei-bin, YANG Reng-cai, WANG Yi-quan

Chinese Journal of Energetic Materials, 2016, 24(6): 609–613

The cross-section densities of PBX on different height were calculated from polymethyl methacrylate (PMMA) and polytetrafluoroethylene (PTFE) density with the same complex configuration, and were linearly corrected with PBX volume density.

Effect of Thermal Aging and Irradiation on Thermal Expansion Property of TATB Based PBX

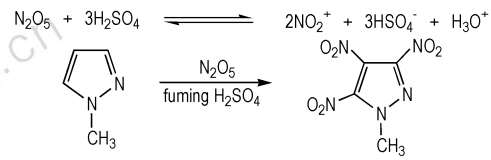


TU Xiao-zhen, SHEN Ming, ZHENG Chun, LI Lei

Chinese Journal of Energetic Materials, 2016, 24(6): 614–617

The thermal expansion property of TATB based polymer bonded explosive (PBX) was studyed by high temperature accelerated aging test, γ and neutron irradiation test.

One Step Synthesis of MTNP with N_2O_5/Oleum System



WU Fei, LI Yong-xiang, HAO Cai-li, XUE Mei, WANG Jian-long, CAO Duan-lin

Chinese Journal of Energetic Materials, 2016, 24(6): 618–620

1-Methyl-3,4,5-trinitropyrazole (MTNP) was synthesized by one-step method using 1-methylprazole (1-MP) as raw materials and N_2O_5-oleum (20%) as nitrating agent. Its structure was characterized by IR, NMR, elemental analysis and MS. The optimum synthetic conditions for MTNP were obtained.