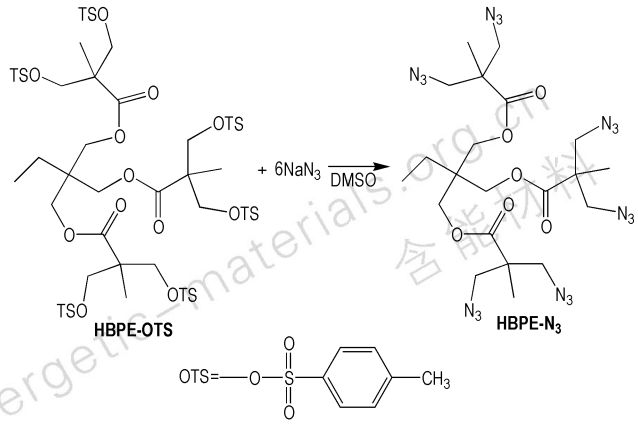
Preparation and Optimization of Azide-terminated Hyperbranched Polyesters

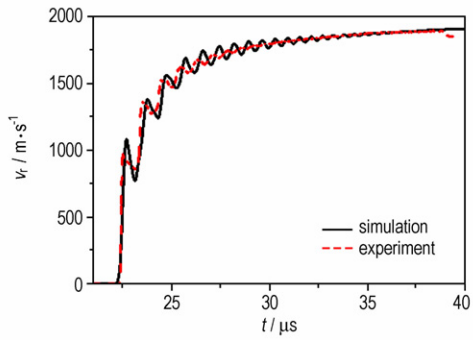


WANG Xiao, YAO Da-hu, BAI Sen-hu, CHAI Chun-peng, LUO Yun-jun

Chinese Journal of Energetic Materials, 2015, 23(6): 512–515

Azide-terminated hyperbranched polyesters were prepared from sodium azide and sulfonyloxy-terminated hyperbranched polyesters in dimethylsulfoxide. The reaction conditions were optimized.

JWL Equation of State of Detonation Product for CL-20 Baesd Pressed Composite Explosive

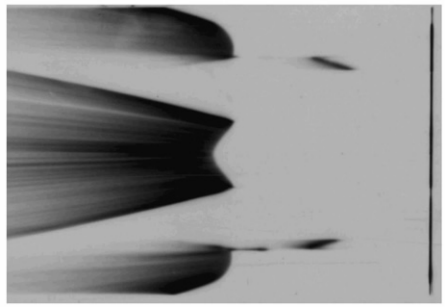


The JWL equation of state of detonation product for CL-20 based pressed composite explosive was researched. The driving ability for C-1 explosive(mass ratio: CL-20 /insensitive binder=94.5/5.5) was evaluated by 25 mm standard cylinder test. The relationships between expansion velocity/displacement of the cylinder wall and time were studied.

NAN Yu-xiang, JIANG Jian-wei, WANG Shu-you, CHEN Dong-ping, SUN Zhan-feng, LIU Xin

Chinese Journal of Energetic Materials, 2015, 23(6): 516–521

Corner Performance of Detonation Waves in HMX-based and TATB-based PBX Explosives

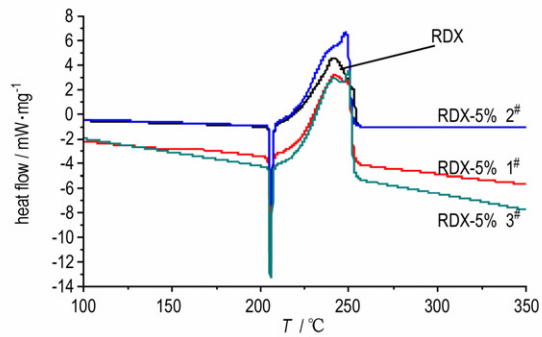


The breakout angles, failure angles and delay time for PBX-Ⅰ containing 95% HMX, PBX-Ⅱ containing 85% HMX and 7% TATB, and PBX-Ⅲ containing 95% TATB with initiating diameter of 7 mm and 10 mm were studied by Mushroom test.

GUO Xiang-li, HAN Yong, LU Xiao-jun, LI Zhi-peng

Chinese Journal of Energetic Materials, 2015, 23(6): 522–526

Properties of RDX Coated by Higher Aliphatic Ester Compounds

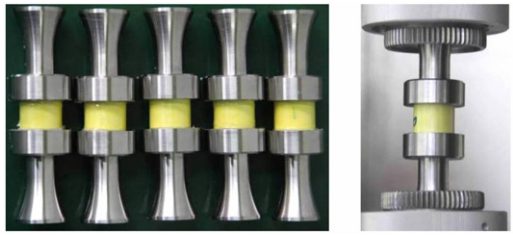


Six RDX samples coated by three higher aliphatic ester compounds(2,3-bis(hydroxymethyl)-2,3-dinitro-1,4-butanediol tetralaurate, 2,3-bis(hydroxymethyl)-2, 3-dinitro-1, 4-butanediol tetrastearate, 2, 3-bis(hydroxymethyl)-2,3-dinitro-1,4- butanediol tetra(12-hydroxyl stearate) with mass fraction of 3% or 5% were prepared to study the effect of higher aliphatic ester compounds on the properties of RDX. All samples were characterized by IR, SEM, laser particle size analyzer, DSC, and their mechanical sensitivity were tested by GJB772-1997.

WANG Juan, SUN Xiao, ZHOU Xin-li

Chinese Journal of Energetic Materials,2015,23(6): 527-531

Adaptability Analysis of Strength Criterion on TATB Based PBX by Indirect Triaxial Tensile Collapse Test

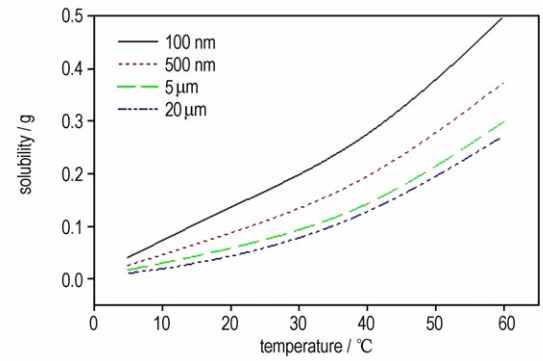


Strength property of TATB based polymer bonded explosive(PBX) under triaxial tension stress state was studied by an end-restraint cylinder tension collapse method. The stress field under critical load was quantitatively analyzed through finite element simulation according to the tested boundary conditions. The adaptability of three typical criterions(uniaxial-strength,Mohr-Coulomb,twin-shear) in strength analysis was illustrated using principal stresses of initial failure position.

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

Chinese Journal of Energetic Materials,2015,23(6): 532-536

Effects of Particle Size and Temperature on Solubility of RDX

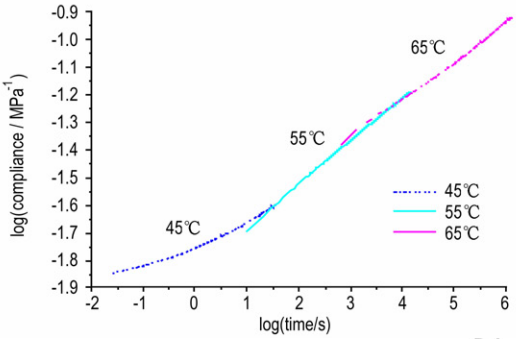


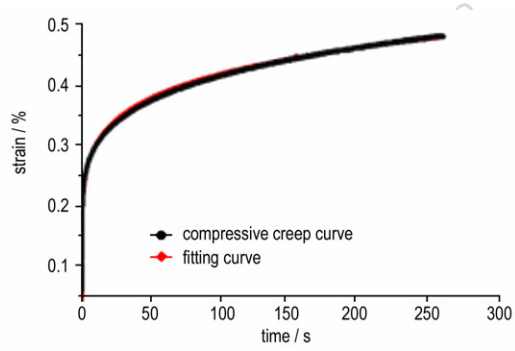
The solubility of RDX with average particle size of 20 μm, 5 μm, 500 nm and 100 nm in the 8 solvents including the ethyl acetate, ethanol, propyl alcohol, isopropanol, *n*-butyl alcohol, sec-butyl alcohol, isobutanol and deionized water at 5, 20, 40 ℃ and 60 ℃ respectively were studied by the evaporation method of the solvent in the saturated solution.

LIU Jie, YANG Qing, SONG Jian, JIANG Wei, LI Feng-sheng

Chinese Journal of Energetic Materials,2015,23(6): 537-542

Simulation on Deformation of HMX based PBX by Thermal-pressure Treatment



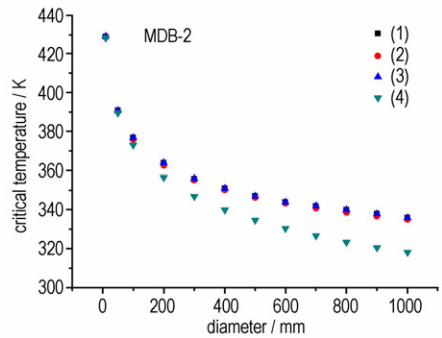


LAN Qiong, TANG Wei, HE Jian-hua, YONG Lian, HAN Chao, YANG Bao-gang

Chinese Journal of Energetic Materials,2015,23(6): 543-547

Creep curves for HMX based PBX under 80 ℃ were obtained by time temperature equivalence principle, and the creep model based on modified time hardening theory was obtained. The deformation of HMX based PBX during the thermal-pressure process was simulated.

Evaluating the Thermal Safety of Propellants by Critical Temperature of Thermal Explosion

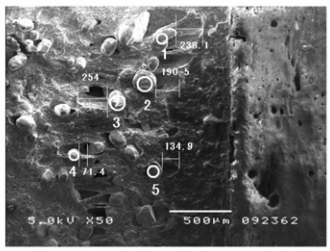


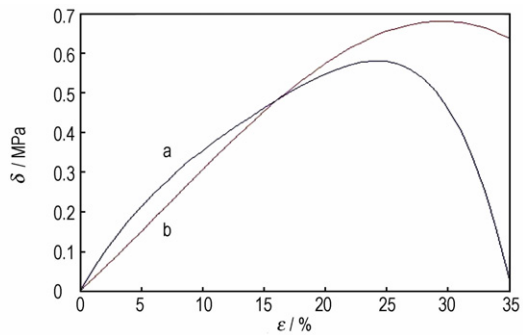
ZHENG Chao-min, WANG Qiong, DING Li, ZHANG Dong-mei, LIU Wen-liang

Chinese Journal of Energetic Materials,2015,23(6): 548-552

Thermal explosion tests of double-base propellant charges and modified double-base propellant charges with diverse diameters were studied to establish a test method to evaluate the thermal safety and explore the feasibility using the critical temperature of thermal explosion.

HTPB Propellant/Liner Adhesive Interface Failure Behavior Based on SEM In Situ Tension



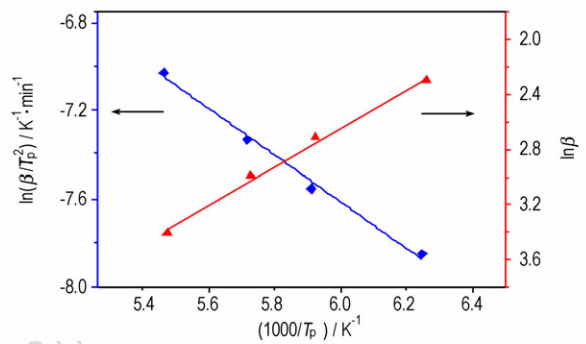


YANG Ming, LI Gao-chun, QIU Xin, JIANG Ai-min

Chinese Journal of Energetic Materials,2015,23(6): 553-557

The damage process of HTPB propellant/liner adhesive interface was observed by SEM in situ tension system. The real-time SEM images of deformation and failure for interface were collected. The micro mechanism of deformation and failure of adhesive interface was analyzed combining with the macroscopic stress-strain curve.

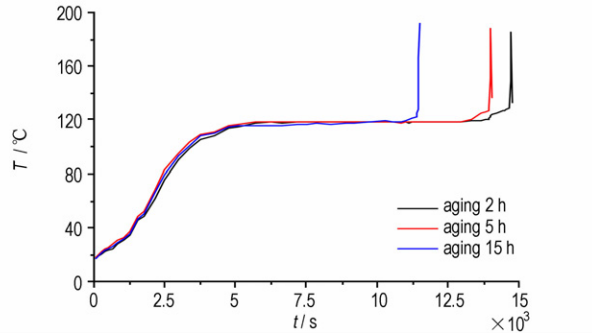
Curing Kinetics and Rheology Property of Acrolein-pentaerythritol Resin System



Thenon-isothermal curing kinetics of acrolein-pentaerythritol resin system were studied by dynamic differential scanning calorimetry(DSC). And the curing kinetic model for acrolein-pentaerythritol resin system was established as well as the rheological model based on the viscosity experiments at 341,347,353 K and 359 K.

CAI Jia-lin, GAO Deng-pan, ZHEN Shen-sheng, CHI Yu
Chinese Journal of Energetic Materials,2015,23(6): 558-562

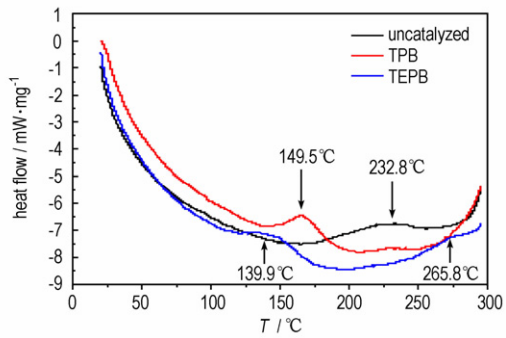
Cook-off Test of GATo-3 Propellant



Cook-off test of GATo-3 propellant with different aging degree was carried out by a self-designed device. The self-ignition temperature and self ignition delay period of GATo-3 propellant under the different experimental conditions were experimentally obtained. The related kinetic parameters of GATo-3 propellant were obtained via calculation and the experimental phenomenon were analyzed.

CHEN Chen, LU Gui-e, JIANG Jin-yong, JIA Hao-nan, QIN Ying-jie, LI Yang
Chinese Journal of Energetic Materials,2015,23(6): 563-567

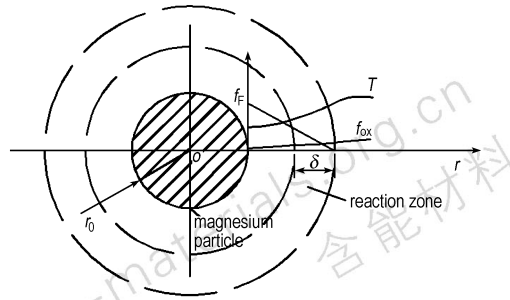
Effect of Bismuth-containing Catalysts on HTPB Curing Kinetics



Effect of TPB and TEPB on kinetics of HTPB-TDI curing reaction were studied by non-isothermal DSC and the curiong reaction kinetic equations were established. Catalytic activity was also discussed based on the kinetic parameters.

OU Ya-peng, CHANG Shuang-jun, ZHANG Bai-lei
Chinese Journal of Energetic Materials,2015,23(6): 568-572

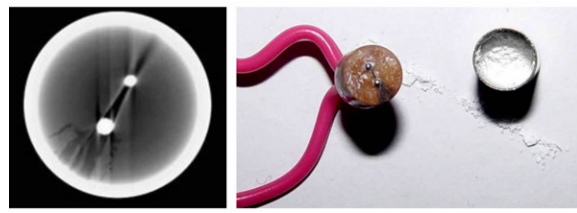
Limit-rate Combustion Model of Magnesium Metal Particle and Numerical Analysis



Based on the Arrhenius law, a one-dimensional spherical symmetric quasi-steady combustion model of limit reaction rate of magnesium particle was established.

LIN Chang-jin, WANG Hao , ZHU Chen-guang, ZHANG Fu
Chinese Journal of Energetic Materials,2015,23(6): 573-577

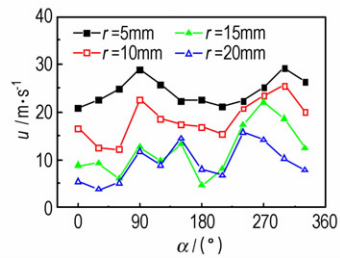
Response to High Voltage Electrostatic Discharge for Exploding Bridgewire Detonators



The response of exploding bridgewire detonators with discharge types of pin-pin and pin-shell to high voltage electrostatic discharge(ESD) was studied at the circuit parameters of 250 kV,1000 pF,1Ω.

LI Zhi-peng, ZHANG Pan-jun, Lü Zi-jian, LONG Xin-ping, DAI Bin
Chinese Journal of Energetic Materials,2015,23(6): 578-582

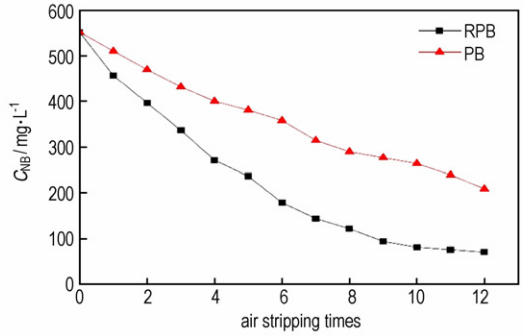
Motion Properties of Spray Particles from Impinging Nozzle at Atmospheric Environment



To investigate the motion properties of spray particles from impinging nozzle at atmospheric environment, an impinging nozzle was designed. Phase doppler particle analyzer was used to record the effects of the nozzle pressure on the motion properties of spray particles. The distributions of axial velocity and radial velocity for particles were analyzed.

LIU Kun, YU Yong-gang,ZHAO Na, WANG Shan-shan
Chinese Journal of Energetic Materials,2015,23(6): 583-588

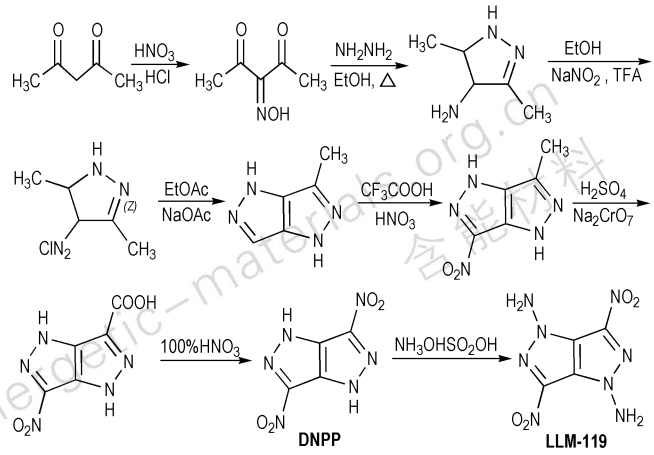
Combined Treatment of Air Stripping-O_3 and H_2O_2 Oxidation for High Concentration Nitrobenzene-containing Wastewater Enhanced by High Gravity Technology



An air stripping-O_3/H_2O_2 oxidation treatment process was established. The pretreatment of high concentration nitrobenzene-containing wastewater was conducted by air stripping method.

FENG Zhi-rong, JIAO Wei-zhou, LIU You-zhi, GUO Liang, XU Cheng-cheng, YU Li-sheng, WANG Yong-hong
Chinese Journal of Energetic Materials,2015,23(6): 589-593

Research Progress in Gas Producing Fuel for Gas Generant

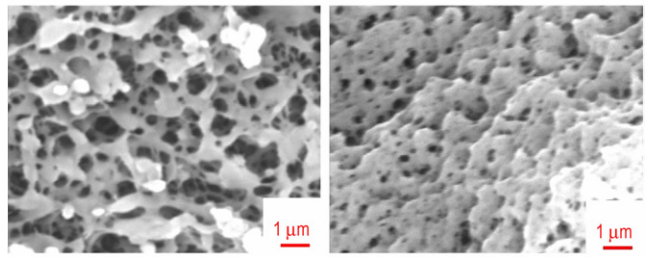


The developments of azide, azole, guanidine and azine fuel for gas generantwere reviewed. Traditional fuel for gas generant is being replaced by new fuel for gas generant because it is poisonous and harmful to environment. The new fuel for gas generant becomes a hot research topic due to its high-nitrogen content, good thermal stability, non-toxicity, and green environmental protection.

ZHANG Kai, SHI Da-xin, ZHANG Qi, SUN Ke-ning, LI Jia-rong

Chinese Journal of Energetic Materials, 2015, 23(6): 594–605

Preparation and Characterization of Porous Reticular HMX

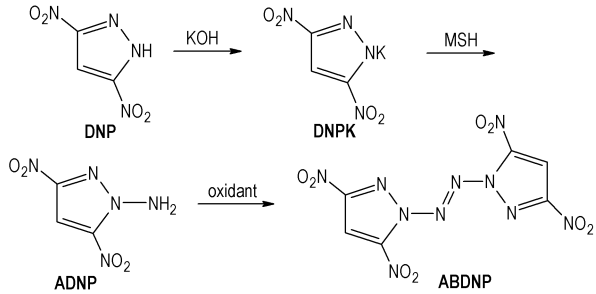


Tow porous reticular HMX, PHMX-A and PHMX-B, were prepared by adding octogen (HMX)/ dimethylsulfoxide (DMSO) complex into pure distilled water or the solution containing polyvinyl pyrrolidone, respectively. Their structures were characterized by scanning electron microscope, X-Ray diffraction, mercury pressure method and thermogravimetry-differential scanning calorimetry.

CHEN Ya, XU Rui-juan, LIU Yu, ZHANG Qi, HAO Shi-long, LI Jing-shan

Chinese Journal of Energetic Materials, 2015, 23(6): 606–609

Synthesis of 1,1′-Azobis(3,5-dinitropyrazole)



A nitrogen-rich, polynitro energetic compound, 1,1′-azobis(3,5-dinitropyrazole) (ABDNP), was synthesized using 3,5-dinitropyrazole (DNP) as starting material, and its structure was characterized by IR, ^{1}H NMR, ^{13}C NMR, MS and elemental analysis.

LI Ya-nan, YU Tao, LIAN Peng, LI Xiang-zhi, WANG Bo-zhou

Chinese Journal of Energetic Materials, 2015, 23(6): 610–612
