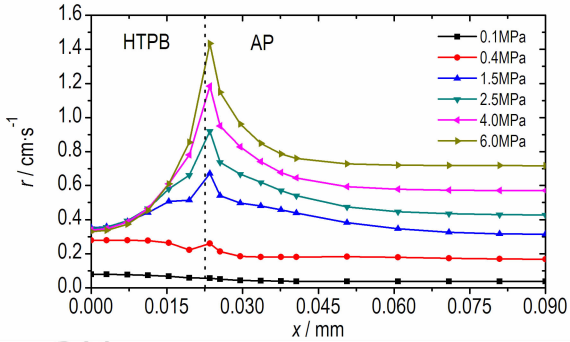
Numerical Simulation of Micro-scale Combustion Characteristics of AP/HTPB Propellant

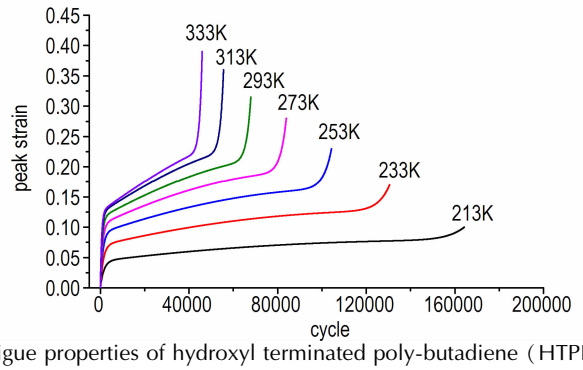


A 2D steady state combustion model for microscopic flame structure and burning characteristics of AP/HTPB composite solid propellant was established. The sandwich structure was adopted in the model, including the coupling between gas-phase flame and solid-phase propellant.

MA Long-ze, YU Yong-gang

Chinese Journal of Energetic Materials, 2017, 25(3): 178–183

Effect of Temperature on Fatigue Properties of HTPB Propellant

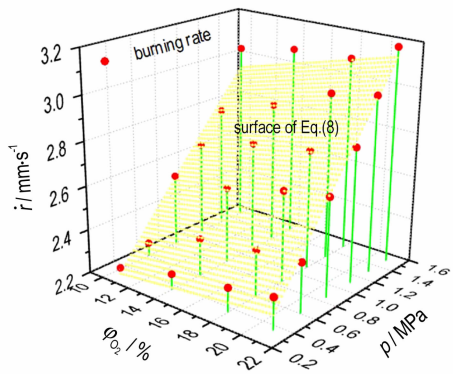


The fatigue properties of hydroxyl terminated poly-butadiene (HTPB) propellant were studied at different temperatures (213 K to 333 K) through the fatigue cyclic loading tests. Taking peak strain as damage factor, based on damage mechanics and viscoelastic theory, a three-stage model of fatigue damage with temperature effect of HTPB propellant was established.

LIANG Wei, LÜ Qing-shan, CHEN Xiong, XU Jin-sheng, TONG Xin, YAN Xiao-jing

Chinese Journal of Energetic Materials, 2017, 25(3): 184–190

Effect of Environment Oxygen Content and Pressure on the Combustion of Aluminum-magnesium Fuel-rich Propellant

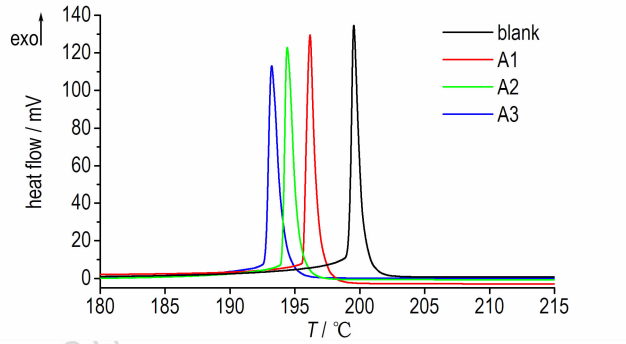


The effect of environment oxygen content on the combustion characteristics of aluminum-magnesium fuel-rich propellant was studied. The ignition process, flame temperature and burning rate of the propellant were discussed. The effect of pressure and oxygen content on burning rate is accord with *B*-number theory. The sensitivity coefficient ratio shows that the pressure is the main factor to affect the burning rate, however, as the pressure increases, the influence of pressure on the burning rate reduces, relatively.

XIANG Heng-sheng, CHEN Xiong, ZHOU Chang-sheng, LAI Hua-jing

Chinese Journal of Energetic Materials, 2017, 25(3): 191–197

Thermal Behavior and Mechanical Property of GAP-base Energetic Thermoplastic Elastomer Modified Single-base Propellant

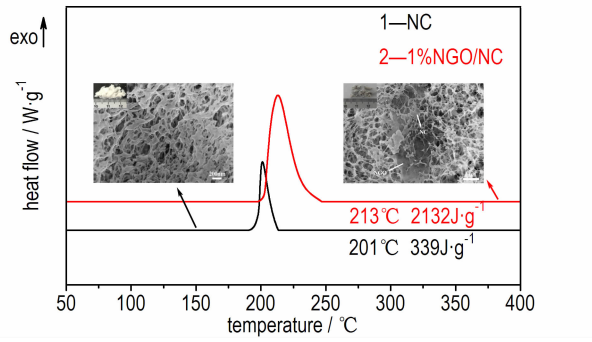


The single perforation cylinder modified single-base propellant containing GAP-base energetic thermoplastic elastomer were prepared. The thermal stability was evaluated by methyl violet method and vacuum stability test. The thermal decomposition process of the sample was investigated by using differential scanning calorimetry method. The impact and compression properties of the sample were studied.

GUO Mao-lin, MA Zhong-liang, HE Li-ming, HE Wei, ZHU Lin

Chinese Journal of Energetic Materials, 2017, 25(3): 198–202

Preparation and Thermal Decomposition Properties of NGO/NC Energetic Composites

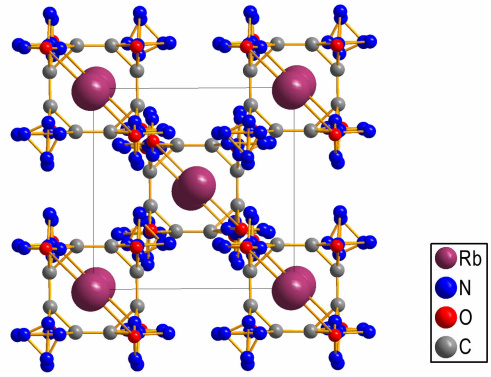


An energetic combustion catalyst nitrated graphene oxide(NGO) was introduced to nitrocellulose(NC) and NGO/NC energetic composites were prepared. Fourier transform infrared spectroscopy(FT-IR) and scanning electron microscope(SEM) were used to investigate the structure and morphology of NGO/NC energetic composites, respectively. The thermal decomposition properties of NC in the presence of NGO were characterized through thermogravimentry-differential scanning calorimetry(TG-DSC).

YUAN Shen, LI Zhao-qian, DUAN Xiao-hui, LUO Qing-ping, LIU Xun, PEI Chong-hua

Chinese Journal of Energetic Materials, 2017, 25(3): 203–208

Synthesis, Crystal Structure and Properties of a Novel Energetic Material Dirubidium 5, 5′-Bis(tetrazole-1-oxide)

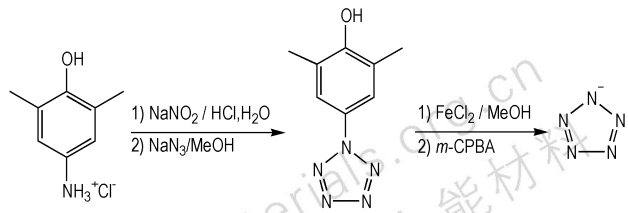


A new green energetic material dirubidium 5,5′-bis(tetrazole-1-oxide)(BTORb) was synthesized and characterized.

ZHANG Zhi-bin, YANG Ting, YIN Lei, YIN Xin, ZHANG Jian-guo

Chinese Journal of Energetic Materials, 2017, 25(3): 209–214

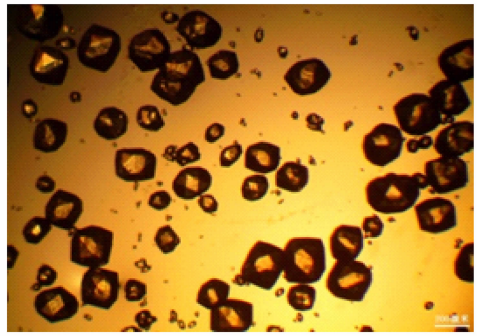
Synthesis and Characterization of Pentazole Anion in Methanol



3,5-Dimethyl-4-hydroxy phenyl-pentazolewas synthesized from 3, 5-dimethyl-4-hydroxy aniline hydrochloride. Transition metal salts and peroxides were used to break C—N bond in 3,5-dimethyl-4-hydroxy phenyl-pentazole. The degree of reaction was detected by mass spectrometry. The aromaticity of the target product was studied by isotope labeling experiments.

XU Bing-tao, WANG Peng-cheng, WANG Qian, ZHANG Chong, HU Bing-cheng, LU Ming
Chinese Journal of Energetic Materials, 2017, 25(3): 215–220

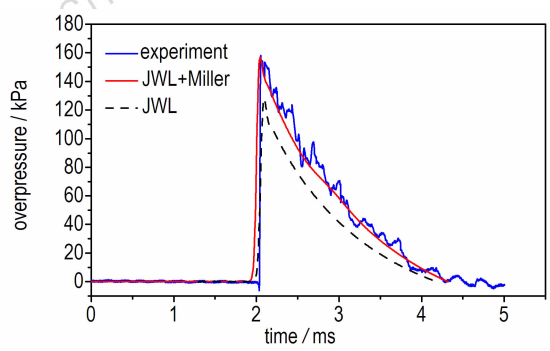
Production of the Large Smooth ε-CL-20 Particle by an Alternative Method of Solvent and Anti-solvent



The large particle ε-CL-20 were prepared by adding CL-20 filtrate to anti-solvent and the secondary adding high volumes of anti-solvents. The effect of solvent volume and stirring rate on the morphology and size of ε-CL-20 was analyzed. The performances of ε-CL-20 after crystallization were characterized.

HUANG Yang-fei, JIAO Qing-jie, GUO Xue-yong, WEI Hua
Chinese Journal of Energetic Materials, 2017, 25(3): 221–225

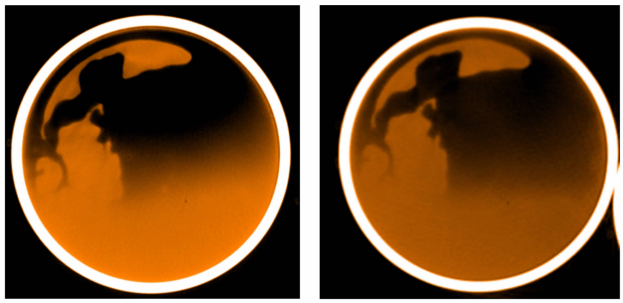
Study on JWL-Miller Equation of State of RDX-based Thermobaric Explosive



The cylinder test with diameter 25 mm and some static explosion experiments were carried out. The parameters of Jones-Wilkins-Lee (JWL) equation of state were obtained by the cylinder test, JWL-Miller model was introduced to simulate the propagation process of shock waves of thermobaric explosive (TBE). The curves of overpressure-time obtained by experiment and simulation were compared.

TIAN Shao-kang, LI Xi, LIU Bo, FAN Wei, HAN Zhi-wei, WANG Bo-liang
Chinese Journal of Energetic Materials, 2017, 25(3): 226–231

Temperature Adaptability of Cast PBX under Restriction of Shell

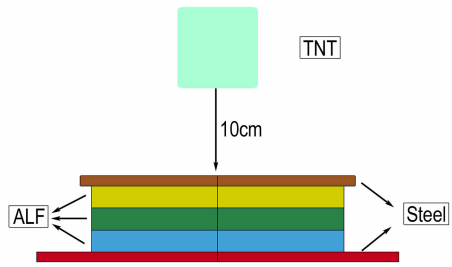


ZHENG Bao-hui, YIN Ming, GENG Cheng-zhen, CHEN Xi-zhou, LIU Tao, GAO Da-yuan, TANG Ying, LUO Guan

Chinese Journal of Energetic Materials,2017,25(3): 232-239

After temperature impact test and temperature cycle test, there is not obvious thermal damage in the cast PBX and the original damage does not extend obviously, revealing that the cast PBX has excellent temperature adaptability.

Blast-resistance Performances of Multilayers Aluminum Foam Sandwich Panels

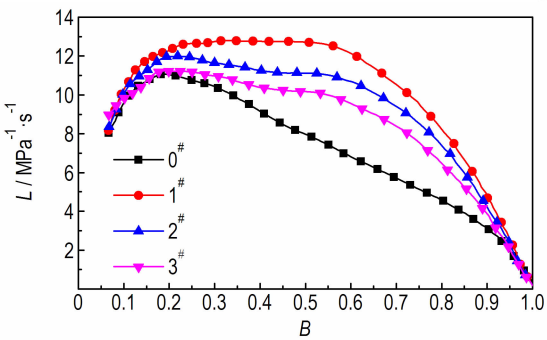


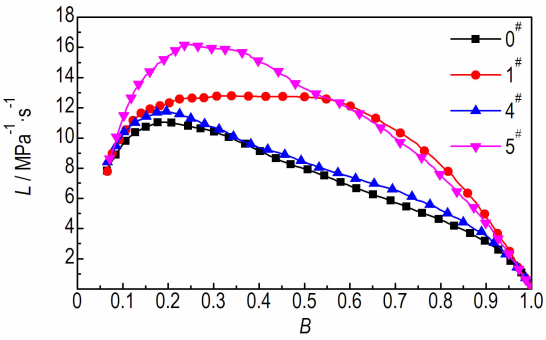
GU Wen-bin, XU Jing-lin, LIU Jian-qing, CHEN Jiang-hai, HU Ya-feng

Chinese Journal of Energetic Materials,2017,25(3): 240-247

Simulation and experiment were used to study the resisting blast capability of multi-layers aluminum foam sandwiche panels with different density arrangements.

Effects of Preparation Conditions on Combustion Performance of Microcellular Oblate Spherical Propellants with Layered Structure



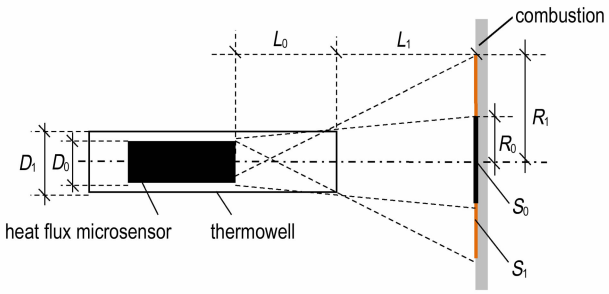


ZHANG Yi-ming, DING Ya-jun, LUO Yuan-xiang, YING San-jiu

Chinese Journal of Energetic Materials,2017,25(3): 248-252

The effects of desorption time and foaming temperature on the combustion performance of microcellular oblate spherical propellants with layered structure were investigated.

Research on Measurement Method of Propellant Combustion Temperature with Broadband Thermal Radiation

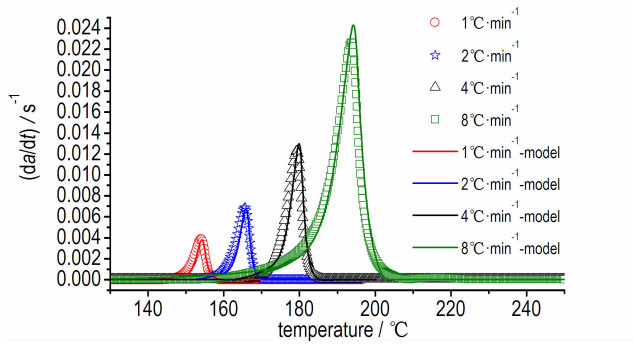


The measurement method for broadband thermal radiation temperature of propellant combustion, was maily accorded to the geometric relations of heat thermal sensor and hermowell, and determined the temperature area and heat radiation receiving conditions. The heat flux value of propellant combustion was measured by using a heat flux sensor, combined with the parameter of test system, and the flame surface temperature of measuring area was calculated.

WANG Yan-ping, ZENG Dan, LI Su-ling, LIU Ying, ZHANG Tong-lai

Chinese Journal of Energetic Materials **,2017,25(3): 253–256**

Thermal Decomposition Characteristic and Kinetics of Nitroguanidine Solution

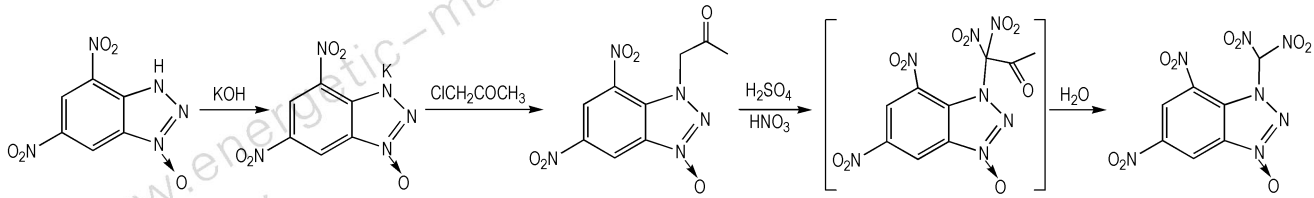


Thermal decomposition characteristic of nitroguanidine (NQ) was studied by dynamic and isothermal differential scanning calorimetry (DSC). Friedman method was used to obtain the activation energy under both mode. The kinetic parameters were settled by model fitting method, and the single step autocatalytic model was verified by the dynamic data.

CHEN Ying-ying, CHEN Li-ping, CHEN Wang-hua, DONG Ze, XUE Bei-bei, ZHANG Jun, WANG Yan

Chinese Journal of Energetic Materials **,2017,25(3): 257–261**

Synthesis and Properties of 4,6-Dinitrobenzotriazol-3-dinitromethyl-1-oxide



Using 4,6-dinitrobenzotriazol-3-ium-1-oxide(DNBTO) as starting material, 4,6-dinitrobenzotriazol-3-dinitromethyl-1-oxide (TNBTO) was firstly designed and synthesized, via the reactions of metathesis, substitution and nitration-hydrolysis.

HUO Huan, LIAN Peng, ZHAI Lian-jie, LI Ya-nan, WANG Bo-zhou, BI Fu-qiang

Chinese Journal of Energetic Materials **,2017,25(3): 262–264**