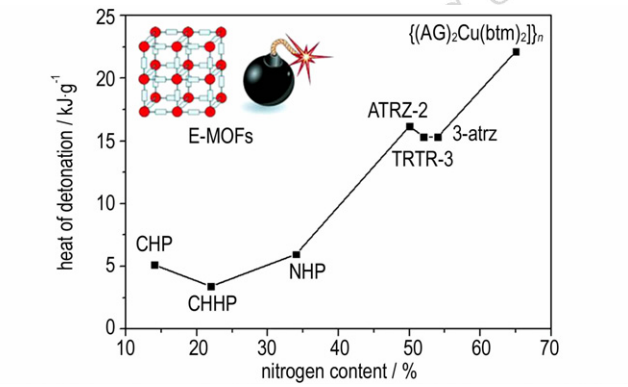
Research Progress in Energetic Metal-organic Frameworks

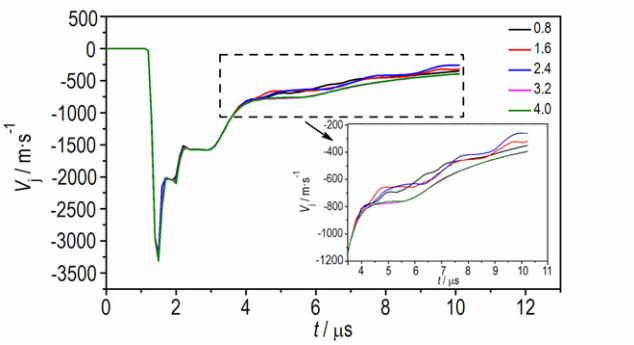


The recent advances in energetic MOFs including their construction strategies, structural characteristics, detonation properties, and safety properties have been briefly reviewed. Through a systematic analyst of these new advances, it can be concluded that the selection of various nitrogen-rich energetic ligands and metal ions are very important for the construction of ideal E-MOFs with excellent energetic and safety properties, which can provide guidelines for the future design of new generation high-performance E-MOFs.

WANG Zhi, WANG Yi, WANG Kang-cai, ZHANG Qing-hua

Chinese Journal of Energetic Materials,2017,25(6): 442–450

Anti-jet Penetration Performances of the Ceramic/Aluminum Foam/Aluminum Alloy Composite Armor

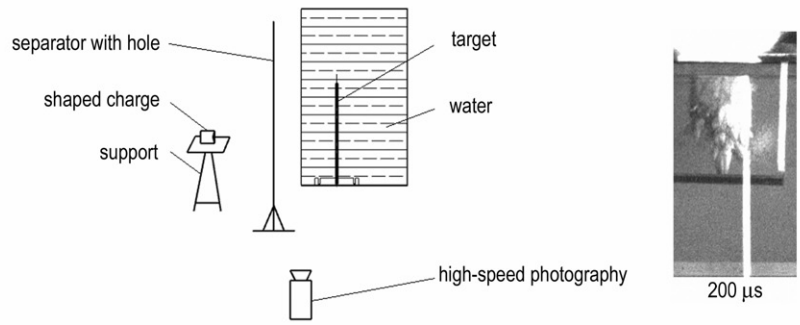


Based on theory of stress-wave propagation property, the resistance performance of composite armor with aluminum foam was studied, from views of different aluminum foam sandwich thickness and combinations of front-back plate thickness, and composite armor angle.

GOU Rui-jun, SUN Dan, ZHANG Bo

Chinese Journal of Energetic Materials,2017,25(6): 451–458

Numerical Simulation and Experimental Study on Flight Characteristics and Penetration Against Spaced Targets of EFP in Water

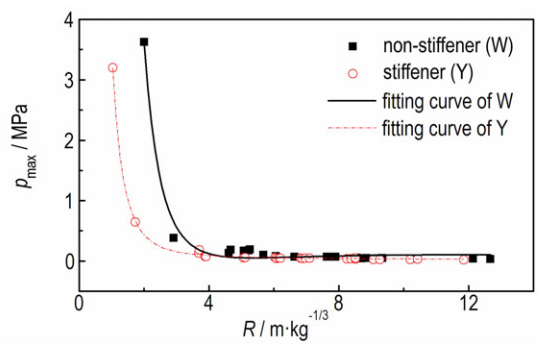


The rule of velocity decrease, mass loss and penetration capability against spaced targets under different distance conditions of EFP in water was studied through LS-DYNA simulation and experiments. Sequence of images showing the fight behavior of EFP in water were captured using a high-speed photography.

WANG Ya-jun, LI Wei-bing, WANG Xiao-ming, LI Wen-bin

Chinese Journal of Energetic Materials,2017,25(6): 459–465

Formation and Blasting Field Characteristics of Moving Cloud Detonation

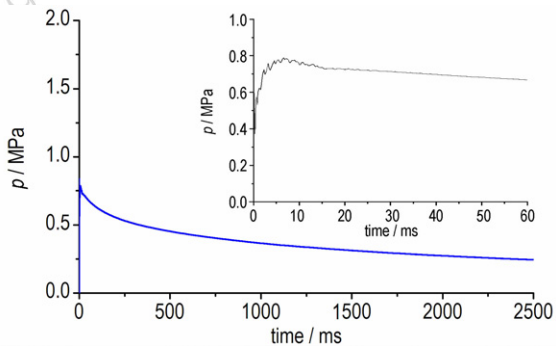


A high-speed motion analyzer system and a pressure measurement system were used to measure process of cloud detonation and pressure field during explosion. The static and moving overpressure results were compared.

WANG Ye, BAI Chun-hua, LI Jian-ping

Chinese Journal of Energetic Materials,2017,25(6): 466–471

Effect of Aluminum Size and Content on Explosion Performance of Aluminized Explosives in Confined Space

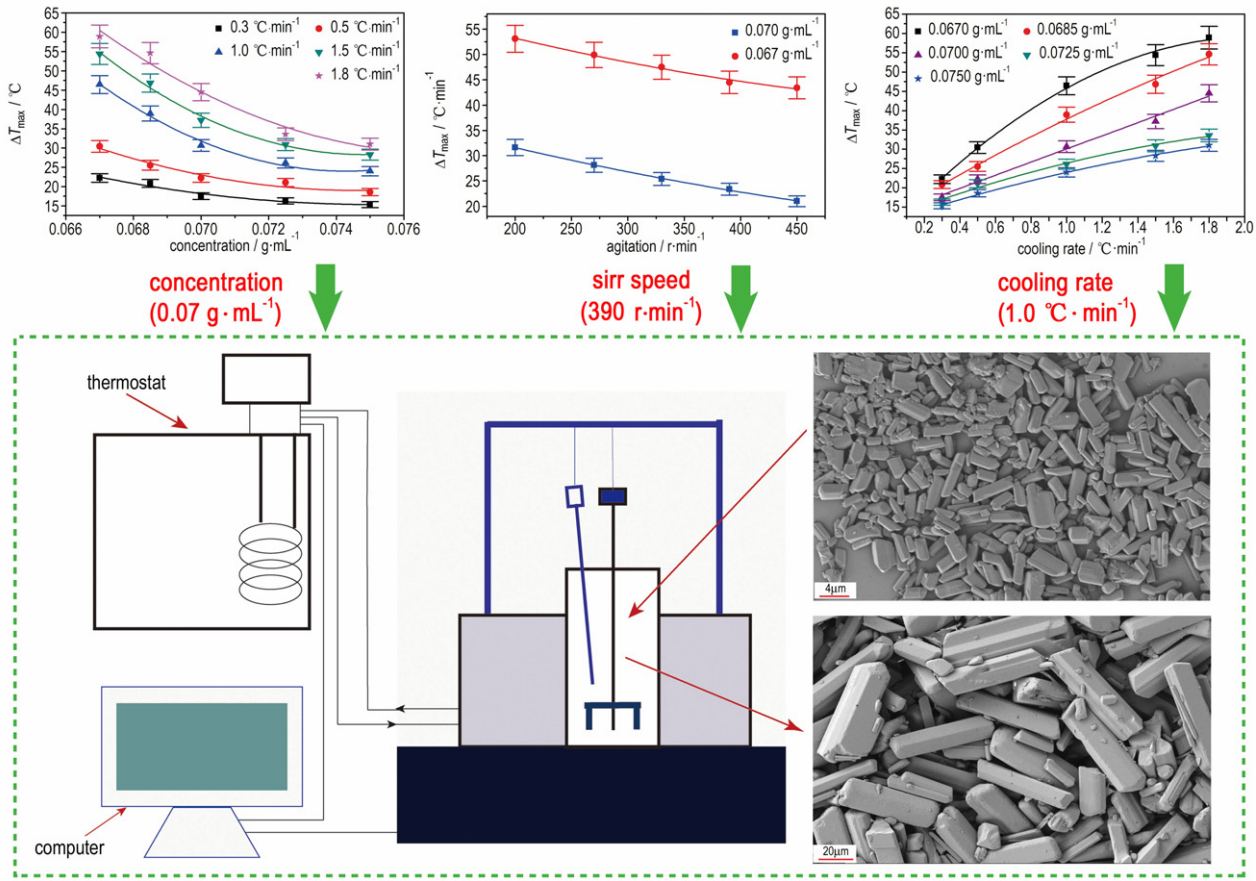


The data processing method of multiple spots average aimed to gain quasic-static pressure and exponential decay similar were used. Three characteristic quantities were used to represent the blast load in fully confined chamber. The relationship of characteristic quantities vs the size and content of aluminum were concluded and the reaction rules of aluminized explosives explosion in confined space were discussed.

DUAN Xiao-yu, GUO Xue-yong, JIAO Qing-jie, ZHAO Qian, ZHANG Jing-yuan, ZHANG Qing-ming

Chinese Journal of Energetic Materials,2017,25(6): 472–478

Crystallization Metastable Zone of LLM-105 in Dimethyl Sulfoxide

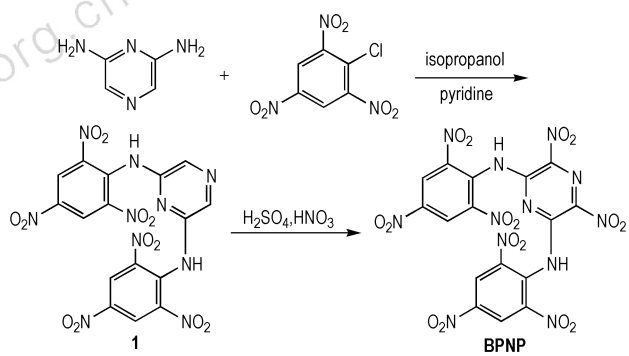


BU Ru-peng, ZHOU Xiao-qing, LI Hong-zhen, YU Yan-wu

***Chinese Journal of Energetic Materials*,2017,25(6): 479–485**

The solubility and supersolubility of LLM-105 in DMSO under different crystallization conditions were measured. The graph shows that the metastable zone widths were broadened with increasing the cooling rate and decreasing the saturation temperature and initial concentration.

Synthesis and Properties of 2,6-Bis(picrylamino)-3,5-dinitropyrazine

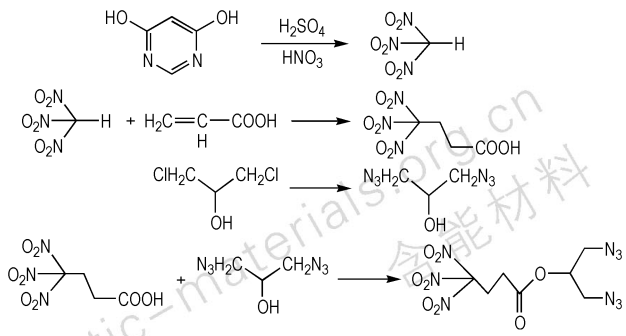


LIU Ji-deng, SHEN Cheng, WANG Peng-cheng, LU Ming

***Chinese Journal of Energetic Materials*,2017,25(6): 486–492**

2,6-Bis(picrylamino)-3,5-dinitropyrazine (BPNP) was synthesized using 2,4,6-trinitrochlorobenzene and 2,6-diaminopyrazine as raw materials. The optimal condensation and nitration reaction conditions were obtained and the therrnal stability of target product was studied by thermogravimetry(TG) and differential scanning calorimetry(DSC). The detonation performances were predicted by Kamlet-Jacobs formula.

Synthesis, Characterization and Thermal Properties of the Energetic Plasticizer 4,4,4-Trinitrobutyric Acid 2-Azido-1-azidomethyl-ethyl Ester

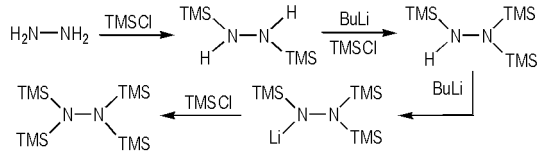


An energetic plasticizer 4,4,4-trinitrobutyric acid 2-azido-1-azidomethyl-ethyl ester (DPTB) was synthesized via esterification reaction from 4,4,4-trinitrobutyric acid (TNB) and 1,3-diazido-propan-2-ol (DAG). The structure of DPTB was characterized by IR, NMR and elemental analyses. In synthesis, traditional esterification method was replaced by DCC/DPTS catalytic esterification method. The effects of substrates ratio, reaction temperature, reaction time and solvent dosage on the esterification reaction were investigated. The thermal decomposition properties of DPTB were studied by TG and DSC.

LU Ting-ting, ZHANG Li-jie, JI Yue-ping, DING Feng, LIU Ya-jing, WANG Ying-lei

Chinese Journal of Energetic Materials, 2017, 25(6): 493–497

Synthesis of Trimethylsilylhydrazine

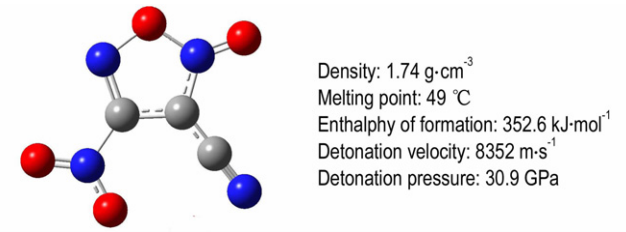


1,2-Bis, tris and tetra-(trimethylsilyl)hydrazine were synthesized with anhydrous hydrazine as precursor, the structures of which were characterized by means of NMR, IR, MS and elemental analysis. The self-condensation reaction of mono(trimethylsilyl) hydrazine and rearrangement reaction of bis(trimethylsilyl) hydrazines were discussed.

DING Ke-wei, LI Tao-qi, XIAO Xiao, LIU Qin, ZHU Yong, GE Zhong-xue

Chinese Journal of Energetic Materials, 2017, 25(6): 498–502

Synthesis and Properties of 3-Cyano-4-nitrofuroxan

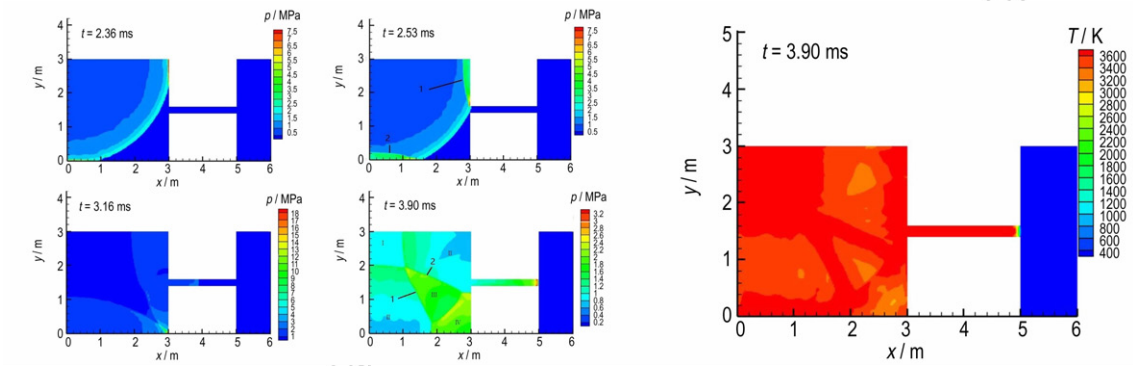


3-Cyano-4-nitrofuroxan was synthesized by a four-step procedure. Its NMR spectra, density, enthalpy of formation and detonation parameters were also discussed.

ZHAI Lian-jie, LUO Yi-fen, LI Ya-nan, HUO Huan, BI Fu-qiang, FAN Xue-zhong, WANG Bo-zhou

Chinese Journal of Energetic Materials, 2017, 25(6): 503–507

Numerical Simulation of Detonation Wave Propagation of Suspending Aluminum Dust in a Space Connected by Channel



The two-phase flow model was used to simulate the propagation of detonation wave of the suspended aluminum dust with a density of 0.304 kg · m^{-3} and a radius of 2.0 μm for the aluminum particles in the space connected by the channel. The pressure and temperature distribution of the flow field behind detonation front during the propagation, reflection and diffraction processes of detonation wave were discussed.

ZAN Wen-tao, HONG Tao, DONG He-fei

Chinese Journal of Energetic Materials,2017,25(6): 508–514

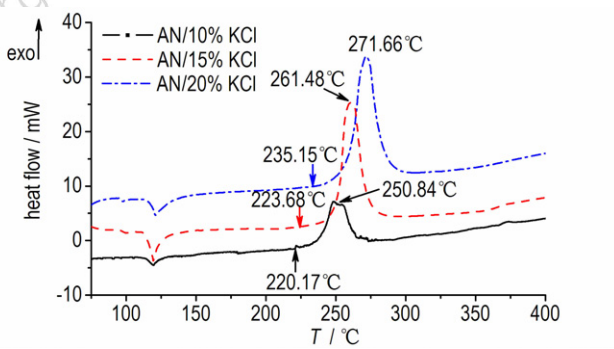
Contrast Testing Study of Electrostatic Monitoring Method for Energetic Powders

Faradaycylinder measurement system may cause the discharge, there is the explosion risk. Induced current integral charge monitoring device has the ability of getting accuracy data and safety, it is the right system for electrostatic discharge monitoring and warning in explosives manufacture.

WEI Shui-ai, BAI Chun-hua

Chinese Journal of Energetic Materials,2017,25(6): 515–519

Effect of Potassium Chloride on the Detonation Performance and Thermal Stability of Ammonium Nitrate



The modified AN containing KCl was prepared via, solution mixing method and mechanical mixing method. The detonation performance and thermal stability of AN/KCl mixtures were investigated by DSC, ARC, UN gap test and Koenen test.

TAN Liu, LIU Da-bin, XU Sen, XIA Liang-hong, WU Qiu-jie

Chinese Journal of Energetic Materials,2017,25(6): 520–528