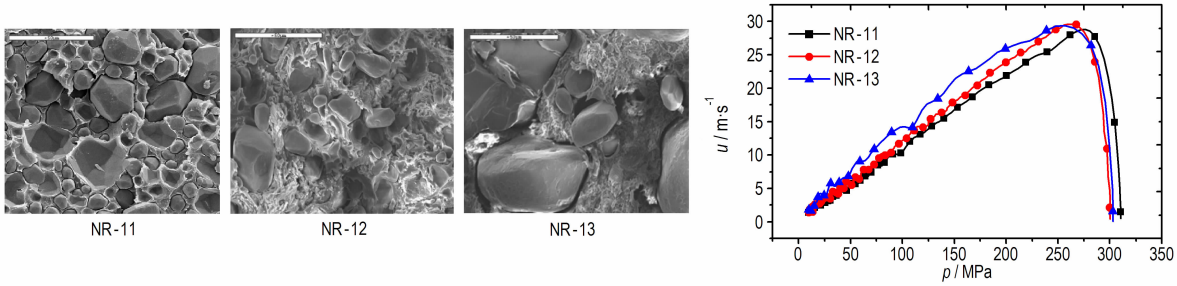
Effect of RDX Particle Size on the Mechanical and Combustion Properties of Nitramine Gun Propellant

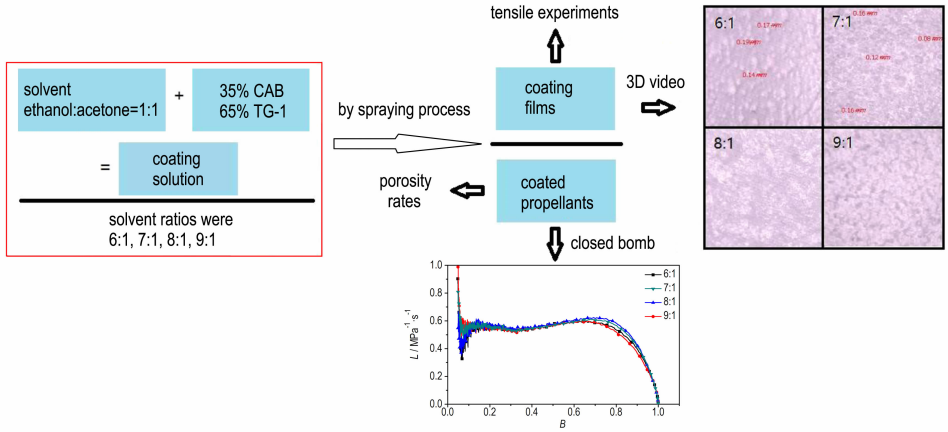


YANG Jian-xing, YANG Wei-tao, MA Fang-sheng, XU Can-qi, JIA Yong-jie, YANG Li-xia

Chinese Journal of Energetic Materials, 2017, 25(9): 706–711

Three kinds of nitramine gun propellants formulations containing 25.0% RDX were designed to investigate the effect of particle size of RDX on the mechanical property and combustion behavior.

Selection of Solvent Ratios for Coating Solution in Gun Propellants Spraying Coating

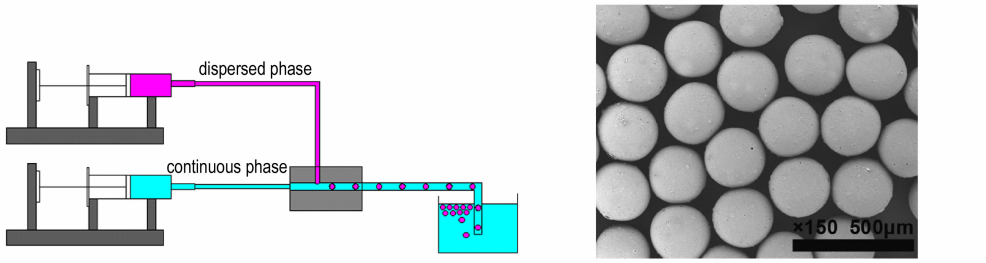


SUN Peng-fei, LIAO Xin, WANG Ze-shan

Chinese Journal of Energetic Materials, 2017, 25(9): 712–716

Coating solution was mixed by solvent and CAB and TG-1 according to different solvent ratios. By spraying process, coating films and coated propellants were produced. As to coating films, tensile experiments and 3D videos were carried on. And by closed bomb experiments, the interior ballistic performance of coated propellants was tested.

Preparation and Characterization of Spherical Propellant by Microfluidic Technology

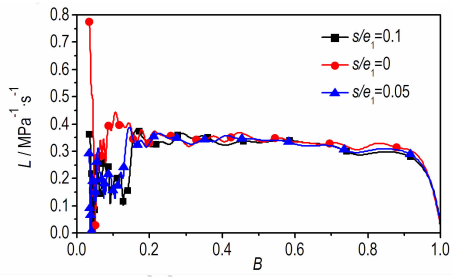


LIU Huan-min, LI Zhao-qian, WANG Yan-jun, DONG Chao-yang, PEI Chong-hua

Chinese Journal of Energetic Materials, 2017, 25(9): 717–721

Spherical propellants with uniform size were prepared by a novel T-shaped micro-channel. Scanning electron microscopy (SEM) show that the size of the spherical nitrocellulose (NC) was uniform, with good monodispersity.

Combustion Characteristics of Seraph Star-hole Gun Propellant with Large Web Size

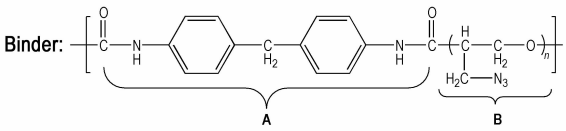


To study the high loading density and high progressive combustion characteristics, a stor-hole stick gun propellant was designed and prepared. The star-hole stick gun propellant with large ratio of length to diameter and right sealing layer thickness has good progressive combustion characteristic.

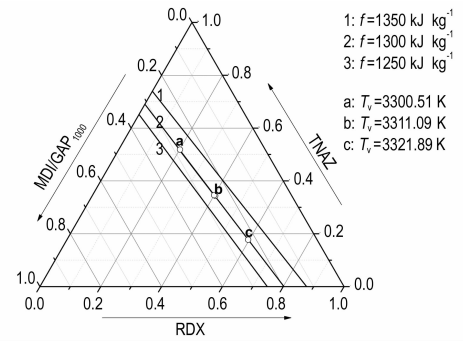
JIA Yong-jie, YANG Jian-xing, SHI Xian-rui, CUI Peng-teng

Chinese Journal of Energetic Materials, 2017, 25(9): 722-725

Calculation and Analysis on Energy Characteristics of Foamed Propellant



Filler: RDX, HNIW, TNAZ, DNTF

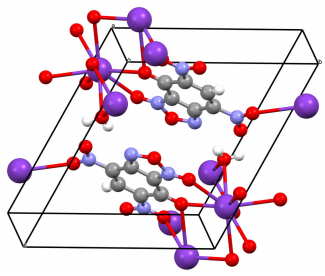


The enthalpies of formation for energetic polyurethane binder using GAP, PGN, PBAMO, PNIMMO as polyether glycol, MDI, TDI, IPDI as polyisocyanate were calculated by group additivity method. The energy parameters of the designed foamed propellant formulations based on RDX, HNIW, TNAZ, DNTF were calculated by inner energy method. Iso-force content triangular plot of 1250, 1300, 1350 kJ · kg^{-1} were drawn.

YANG Wei-tao, LIU Zhe, ZHANG Yu-cheng, YANG Jian-xing

Chinese Journal of Energetic Materials, 2017, 25(9): 726-731

Synthesis, Crystal Structure and Properties of Potassium 7-Hydroxy-4, 6-dinitrobenzofuroxan Monohydrate (KDNP · H_2O)

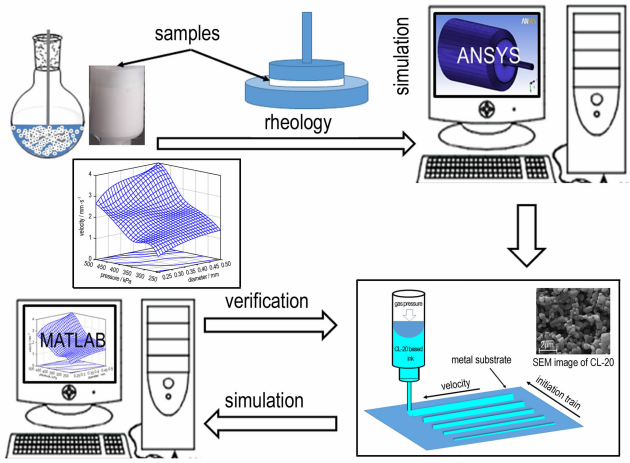


Potassium 4, 6-dinitro-7-oxygen-benzofuroxan monohydrate (KDNP · H_2O) was synthesized by two-step method. The single crystal of the compoud was obtained by solvent evaporation method. Its structure was chracterized by elemental analysis, IR spectroscopy, ^{1}H NMR/^{13}C NMR spectroscopy and X-ray single-crystal diffraction. Its sensitivities were measured by GJB-5891. The detonation parameters of the compoud were calculated by Kamlet-Jacobs equations.

ZHANG Shi-xin, SHENG Di-lun, ZHU Ya-hong, NI De-bin, XU Dong, YU Guo-qiang

Chinese Journal of Energetic Materials, 2017, 25(9): 732-737

Direct Writing Deposition Rule of CL-20 Based Explosive Ink

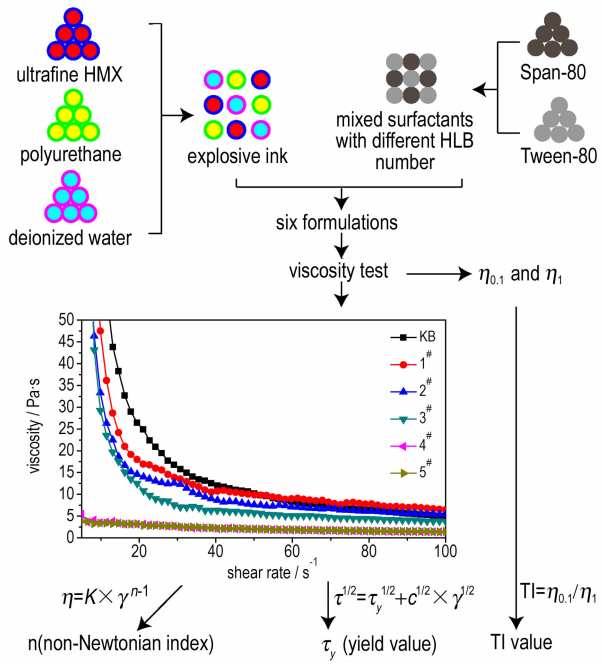


LIU Yi, ZHENG Bao-hui, LI Xian-yin, MAO Yao-feng, ZENG Xin, LUO Guan, WU Kui-xian, NIE Fu-de, WANG Dun-ju

Chinese Journal of Energetic Materials, 2017, 25(9): 738-744

The effect of driving pressure and outlet diameter on the extrusion rate of CL-20 based explosive ink was investigated by the simulation method using Ansys software and the direct writing deposition experiments.

Effect of HLB Numbers of Surfactants on the Rheological Property of HMX/Polyurethane Based Explosive Ink

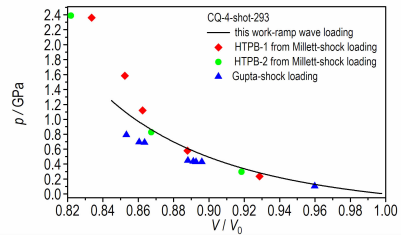


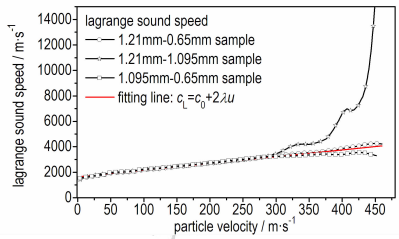
XU Chuan-hao, AN Chong-wei, WANG Jing-yu, YE Bao-yun, SONG Chang-kun, JI Wei

Chinese Journal of Energetic Materials, 2017, 25(9): 745-749

The effect of surfactant under different HLB number on the rheological property of ultrafine HMX/polyurethane base explosive ink was studied and characterized by viscosity, non-Newtonian index, yield value and TI value.

Dynamic Response of HTPB Under Ramp Loading with High Strain Rates



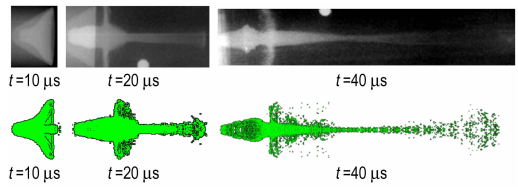


CAI Jin-tao, XIAO Song, WANG Gui-ji, ZHAO Feng, WU Gang, SHUI Rong-jie, XU Chao, TAN Fu-li, ZHAO Jian-heng

Chinese Journal of Energetic Materials, 2017, 25(9): 750–755

The dynamic response of hydroxyl-terminated polybutadiene (HTPB) samples solidified by toluene diisocynate (TDI) were investigated under ramp loading up to 1.2 GPa. The velocity response curves of three HTPB samples with different thickness were obtained by Photonic Doppler Velocimeter (PDV). The sound velocity vs. particle velocity curves and stress vs. specific volume curves were obtained by Lagrange analysis method.

Numerical Simulation of Low Density Particle Jets Formation Based on SPH Method

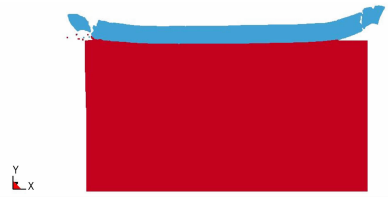


CHEN Jie, YIN Jian-ping, HAN Yang-yang, YI Jian-ya

Chinese Journal of Energetic Materials, 2017, 25(9): 756–761

The Smoothed Particle Hydrodynamics (SPH) method was used to simulate the formation of the Low-density material (PTFE/Cu) liner particle jets by AUTODYN finite element software, and experimental verifications were carried out.

Numerical Simulation on Boundary Effect in Explosive Cladding by Smoothed Particle Hydrodynamics

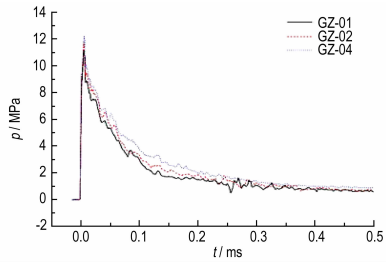


MIAO Guang-hong, LI Liang, JIANG Xiang-yang, LIU Wen-zhen, CHENG Yang-fan, WANG Quan, YU Yong, MA Hong-hao, SHEN Zhao-wu

Chinese Journal of Energetic Materials, 2017, 25(9): 762–766

Two dimensional simulation of the boundary effect in explosive cladding was carried out by using the dynamic analysis software of ANSYS/LS-DYNA and Smoothed Particle Hydrodynamics (SPH) method. The generation mechanism of boundary effect is revealed. In addition, the preventive measures to against such a phenomenon are proposed.

Effect of Different Filling Medium on Detonation Performance of Propellant Charge

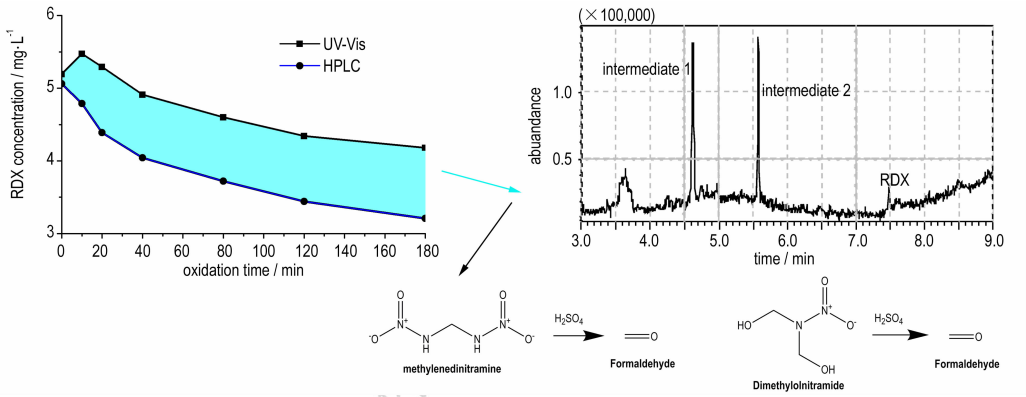


WANG Peng, HE Wei-dong, WEI Xiao-an

Chinese Journal of Energetic Materials, 2017, 25(9): 767–772

In order to study the detonation performance of propellant grains in different medium, the interspaces among the propellant grains were fully filled with water, oxidant solution and oxidant gel, respectively. The detonation performances were studied through the chronometer measurement test, which compared with no filler.

Factors Affecting the Spectrophotometric Determination of RDX in Wastewater by the Oxidation of Ozone

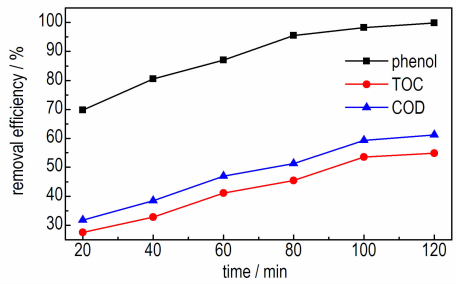


LI Jie, LUO Ming-liang, TANG Shao-ming,
ZHAO Ming-li, XU Rui-juan

Chinese Journal of Energetic Materials,2017,25(9): 773-779

Series of exploring tests were carried out to investigate the interference factors affecting the determination of RDX following the oxidation of O_3 by spectrophotometry. Amine-intermediates generated from the incomplete degradation of RDX during the oxidation of O_3 were proved as the direct interference factors.

Electrocatalytic Oxidation Degradation of Phenol Wastewater with RuO_2-IrO_2-SnO_2/Ti Anode

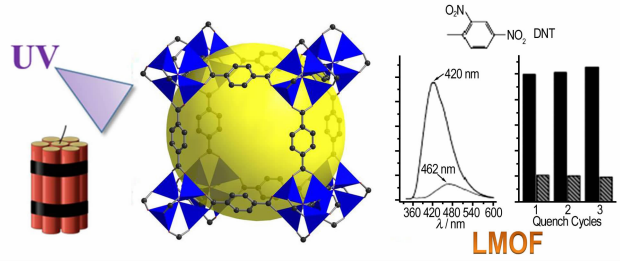


YAN Jun-juan, GAO Jing, LIU You-zhi, YIN Hao-yang,
WU Meng-long

Chinese Journal of Energetic Materials,2017,25(9): 780-785

The electrocatalytic oxidation of simulated wastewater of propellants and explosives with phenol was studied using RuO_2-IrO_2-SnO_2/Ti as anode and Ti as cathode, sodium chloride as elecctrolyte. The effect of sodium chloride concentration, current density, pH value and initial concentration of phenol wastewater on phenol removal efficiency was investigated.

Progress on Luminescent Metal-organic Framework Materials in the Detection of Explosive Substances



YU Yi, JU Jia, LUAN Lin-dong, PAN Zhong-ben,
CAI Hua-qiang

Chinese Journal of Energetic Materials,2017,25(9): 786-792

The recognition and detection of explosives by LMOFs were reviewed. The recognition mechanizm and recognition selectivity of LMOFs were summarized. Future research aspects including the surface modificationof materials, the improvement of water stability and the detection of nitro-geo hetercyclic explosives were discussed.
