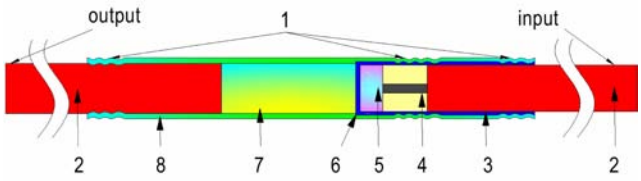
Numerical Simulation and Design of Explosive Diode

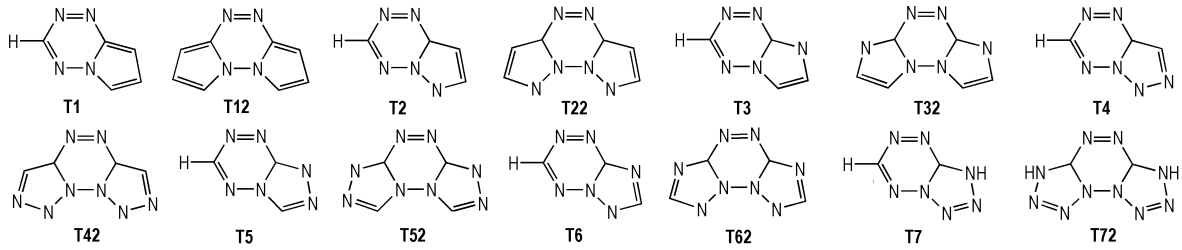


A type of irreversible detonation explosive diode was designed and develop by numerical simulation method. Using the combination of ignition and growth model and ANSYS/LS-DYNA finite element softw are transmitting positive detonation was simulated by various mass of the firing charge and the stopping backward detonation was simulated by various length of the delay element.

CUI Yu, MA Hong-hao, SHEN Zhao-wu, REN Li-jie, YANG Ming, YU Yong

Chinese Journal of Energetic Materials,2017,25(4): 266-272

Theoretial Study on Structure and Properties of Polycyclic Derivatives of 1,2,4,5-Tetrazine Based High Energy Density Materials

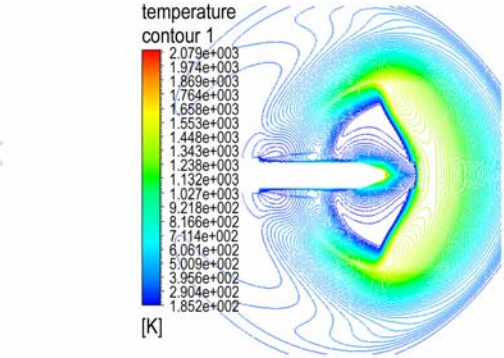


The optimized geometries and enthalpies of formation (ΔH_f) of 14 kinds of 1,2,4,5-tetrazine polycyclic ring derivatives were studied using density functional theory method. The detonation performances were estimated by Kamlet-Jacobs equation.

ZHANG Chi, CHEN Mo, CHEN Xiang, ZHANG Cong, SONG Ji-rong, MA Hai-xia

Chinese Journal of Energetic Materials,2017,25(4): 273-281

Effect of Precursor Flow Field of Muzzle on the Combustion Gas Jet Flow of Gun Propellant

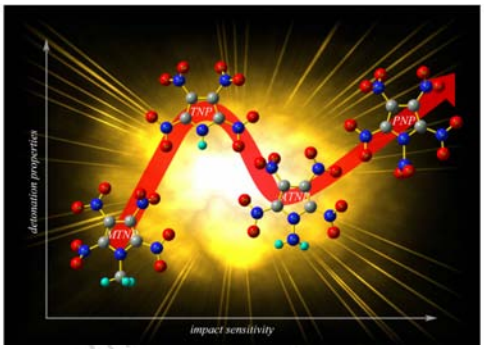


To analyze the effect of precursor flow field on the structure of combustion gas jet and movement of projectiles, based on the finite volume method, two different 2-d axisymmetric numerical simulation models with and without the precursor flow field were established using the Whole Zone Movement Method for block grid division and Realizable k-ε turbulence Model and coupling the interior ballistic process and the Six-DOF equations. Taking the 300 mm counter-mass propelling gun as example, the muzzle flow field characteristics at the ejection speed of 1730 m·s^{-1} were studied.

LI Zi-jie, WANG Hao

Chinese Journal of Energetic Materials,2017,25(4): 282-290

Theoretical Study on Structure and Properties of Tetranitropyrrole and Its Derivatives

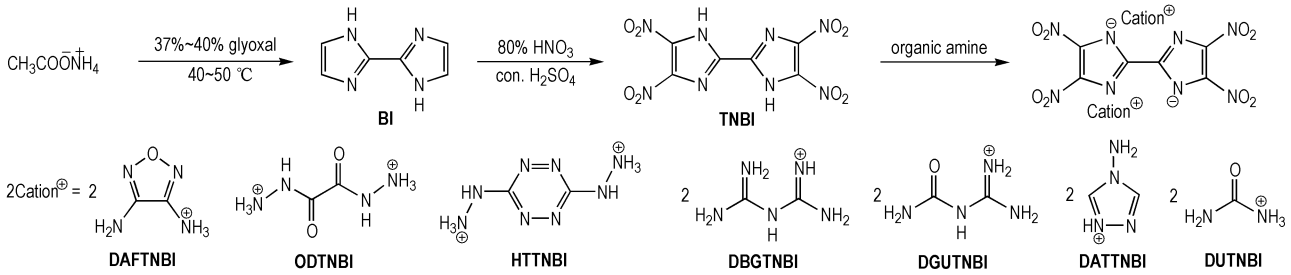


LI Yun-lu, LIU Tian-ying, CAO Duan-lin, WANG Jian-long

Chinese Journal of Energetic Materials, 2017, 25(4): 291–297

The structure, detonation properties and safety performance of tetranitropyrrole and its derivatives were determined using DFT method for the first time.

Synthesis and Thermal Properties of 4,4′,5,5′-Tetranitro-2,2′-biimidazole and Its Energetic Ion Salts

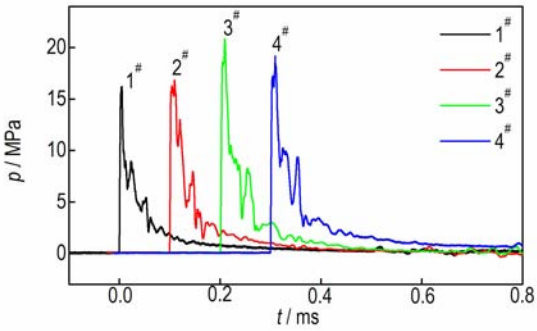


LI Ya-nan, SHU Yuan-jie, ZHANG Sheng-yong, WANG Bo-zhou, ZHAI Lian-jie

Chinese Journal of Energetic Materials, 2017, 25(4): 298–303

4,4′,5,5′-Tetranitro-2,2′-biimidazole and its energetic ion salts were synthesized. The structures of all compounds were confirmed by IR, ^{1}H NMR, ^{13}C NMR and elemental analysis. The single crystal of TNBI · H_2O was obtained in the water system. The thermal properties of seven energetic ion salts were studied.

Influence of Titanium Powder on Detonation Performances and Thermal Decomposition Characteristics of Emulsion Explosive

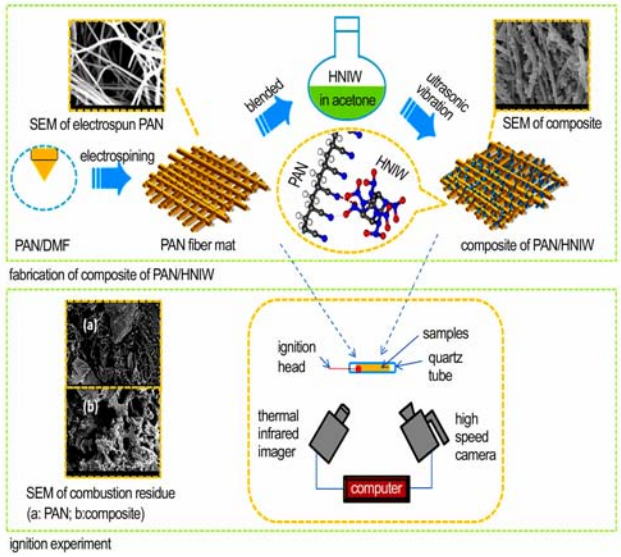


GONG Yue, HE Jie, WANG Xu-guang, YAN Shi-long, CHENG Yang-fan

Chinese Journal of Energetic Materials, 2017, 25(4): 304–308

The effects of titanium powder on the detonation properties of emulsion explosive were studied by underwater experiments and brisance experiments, and compared with aluminized emulsion explosive. The energy parameters of underwater explosion and lead cylinder compression value were obtained. The thermal decomposition characteristics of emulsion explosive containing titanium powder were also discussed.

Preparation of New Structure Energetic Composite of HNIW Implanted into Macroporous Fibosa

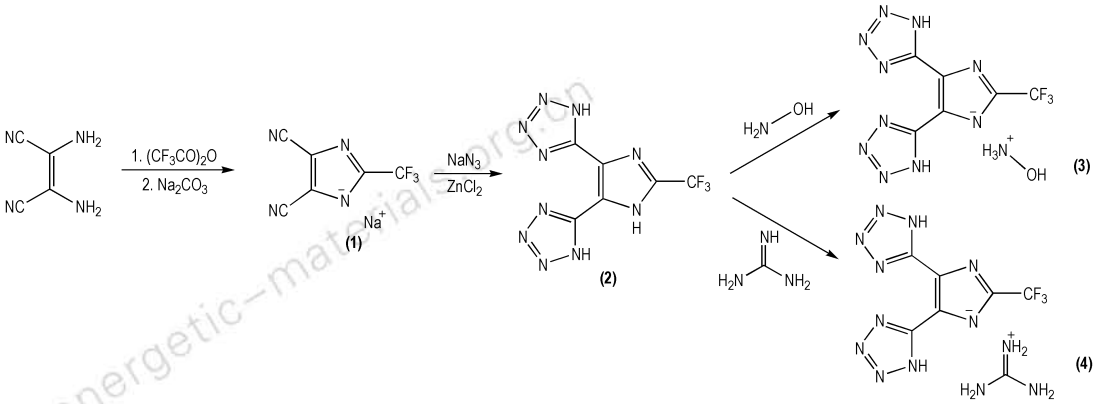


A new energetic composite was prepared compounding high-energy Hexanitro-2,4,6,8,10,12-hexaazaisowurtzitane (HNIW) into macroporous polyacrylonitrile (PAN) fibrosa by electrostatic spinning (ES) method and self-assembly method. The morphology, thermal property and combustion behavior of as-prepared composite were analyzed by SEM, FT-IR, thermal analysis and combustion residues analysis.

LI Ya-ru, REN Hui, JIAO Qing-jie

Chinese Journal of Energetic Materials,2017,25(4):309-314

Synthesis and Characterization of 5,5′-(2-(Trifluoromethyl)-1*H*-imidazole-4,5-diyl)bis(1*H*-tetrazole) and Its Energetic Ionic Salts

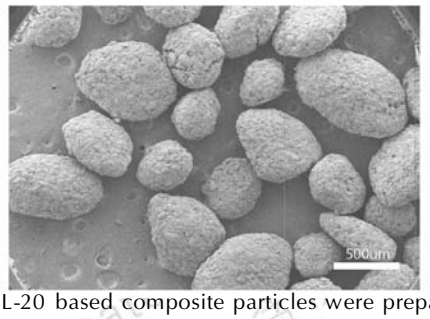


Using diaminomaleonitrile as starting material, a novel energetic compound 5,5′-(2-(trifluoromethyl)-1*H*-imidazole-4,5-diyl)bis(1*H*-tetrazole) was designed and synthesized by condensation cyclization reaction with trifluoroacetic anhydride and the second condensation cyclization reaction. Based on acidity of the compound, two energetic ionic salts of hydroxylamine and guanidine were firstly synthesized, and their structures were characterized by IR, NMR and elemental analysis. The thermal decomposition of 5,5′-(2-(trifluoromethyl)-1*H*-imidazole-4,5-diyl)bis(1*H*-tetrazole) was studied by DSC-TG.

WU Min-jie, BI Fu-qiang, ZHOU Yan-shui, ZHAI Lian-jie, WANG Bo-zhou

Chinese Journal of Energetic Materials,2017,25(4):315-320

Desensitizing Technology of CL-20 by Coating Wax and Estane5703

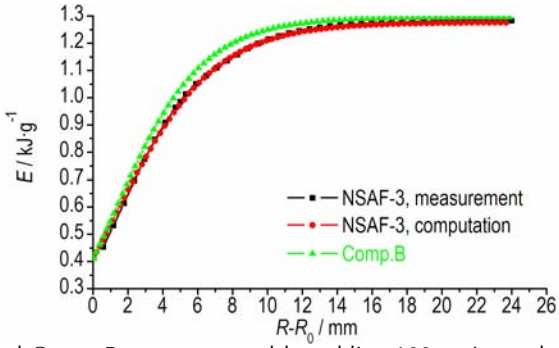


Four kinds of CL-20 based composite particles were prepared by slurry method using CL-20 as filler, wax and Estane5703 as desensitizers. Their crystal form, state of coatiing, thermal decomposition temperature and mechanical sensitivity were tested.

WEI Hua, JIAO Qing-jie, GUO Xue-yong

Chinese Journal of Energetic Materials, **2017**, **25**(**4**): **321**–**325**

Effect of Polymer Additives on Impact Sensitivity and Power of Composition B

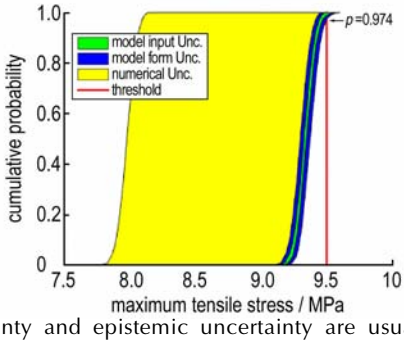


Modified Comp. B were prepared by adding 123 resin, polyester fibre and VP-401 to Comp. B to study the effects of additives on the impact sensitivity and power capability of Comp. B, respectively. Big-bill impact sensivity test, Susan test and cylinder test of the samples were conducted, the changes of the impact sensitivities and power capabilities were obtained. The effects of compressive elasticity and toughness on the impact sensitivity as well as content of additives on the power capability of modified Comp. B were discussed.

GAO Da-yuan, ZHENG Bao-hui, HUANG Heng-jian, CAO Luo-xia, CAO Wei, WEN Shang-gang, WEN Wen, LU Xiang-jun

Chinese Journal of Energetic Materials, **2017**, **25**(**4**): **326**–**332**

Reliability Analysis of Polymer Bonder Explosive Based on Separation between Aleatory Uncertainty and Epistemic Uncertainty

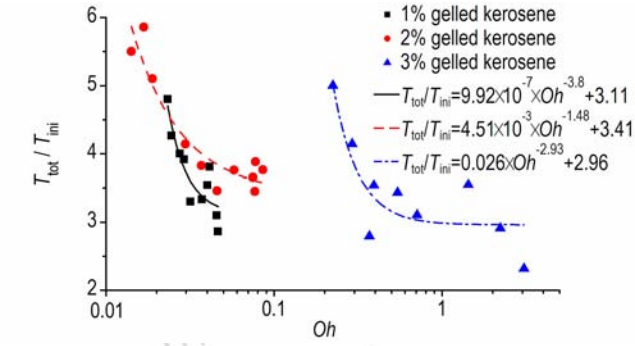


Aleatory uncertainty and epistemic uncertainty are usually existed in the polymer bonder explosive sourced from structural geometry, material property, external force, numerical error, model form error(due to the model assumptions or artificial simplification), and so on. In this paper, all the uncertainty mentioned above were quantified with probability box and propagated with nested sampling method to obtain the uncertainty of response and the reliability interval of the PBX structure consequently.

SHEN Zhan-peng, ZANG Chao-ping, CHEN Xue-qian, LIU Xin-en, HAO Zhi-ming

Chinese Journal of Energetic Materials, **2017**, **25**(**4**): **333**–**341**

Temporal and Spatial Characteristics of Gelled Kerosene Droplet Breakup

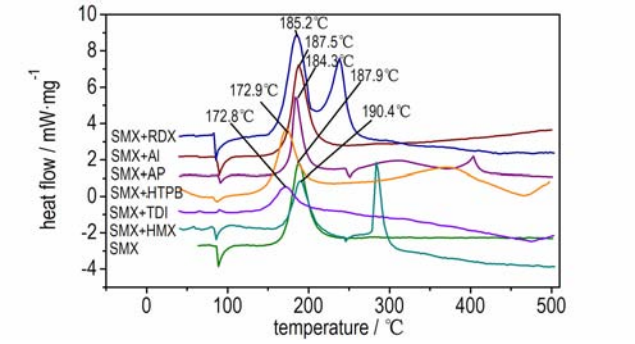


The temporal and spatial distribution characteristics of gelled kerosene were studied by using breakup experimental platform. The different breakup characteristics of kerosene and gelled kerosene were analysed. Relationship between T_{tot}/T_{ini} and Oh, and the variation tendency of streamwise and Cross-stream breakup region with the change of We number were investigated.

CAO Qin-liu, FENG Feng, DENG Han-yu

Chinese Journal of Energetic Materials, 2017, 25(4): 342-347

Synthesis, Crystal Morphology Control of SMX and Its Compatibility with the Components of HTPB Propellant



The compatibilities of SMX with hydroxy-terminated-polybutadiene (HTPB) propellant components, including HTPB, ammonium perchlorate (AP), aluminum powder (Al powder), cyclotetramethylenetetramine (HMX), cyclotrimethylenetrinitramine (RDX), tolylene diisocyanate (TDI) were investigated by DSC.

HOU Bin, HE Jin-xuan, REN Xiao-ting, CAO Yi-lin

Chinese Journal of Energetic Materials, 2017, 25(4): 348-352