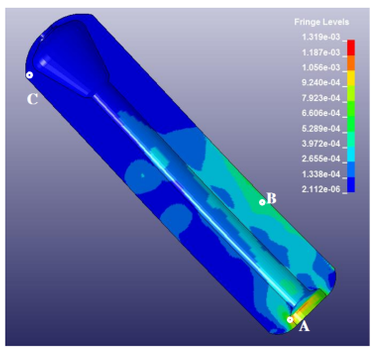
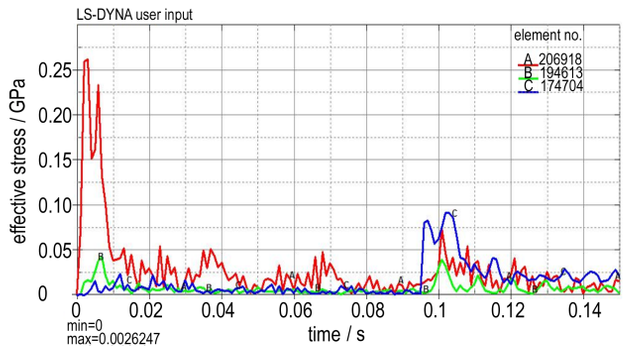
Numerical Simulation and Experimental Analysis of Drop at Different Angle of Solid Rocket Motor



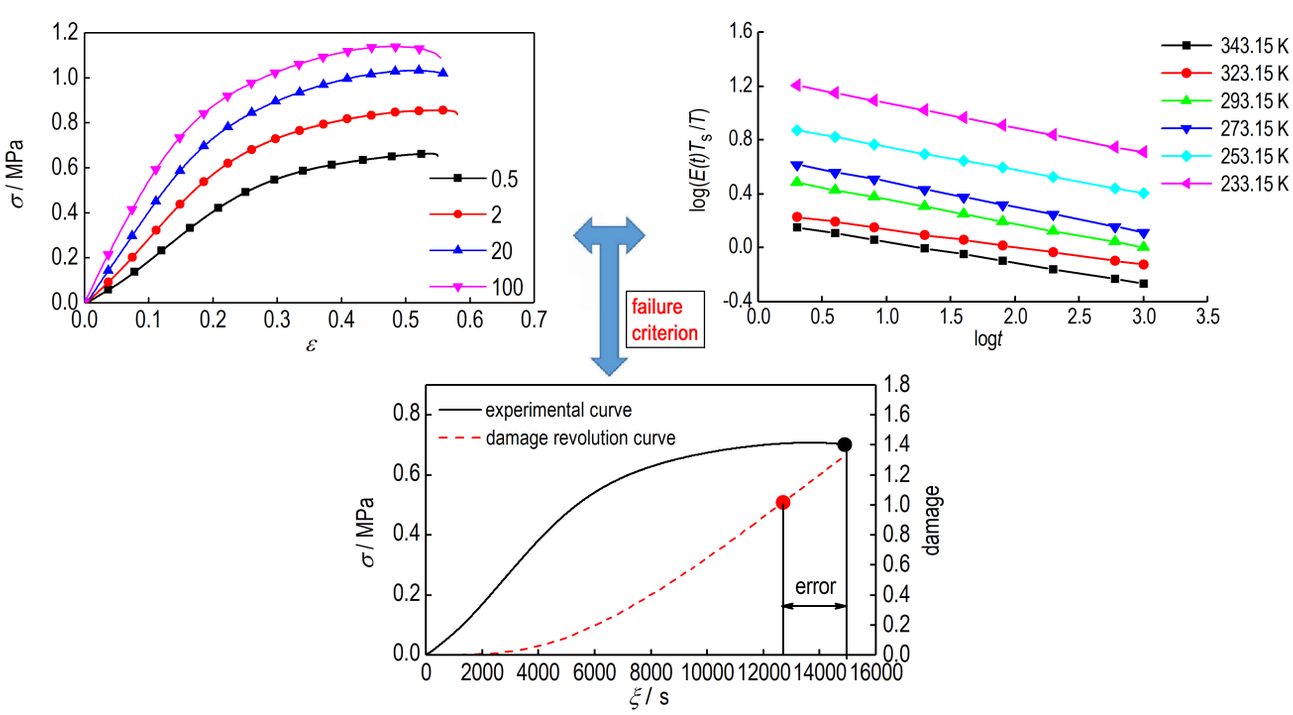


YANG Ming, HUANG Wei-dong, SHEN Wei, LI Gao-chun, LI Jin-fei, WANG Yu

***Chinese Journal of Energetic Materials*,2018,26(9):726-731**

The drop process of solid motor at different angle was analyzed. The stress in propellant can reach a few hundreds megapascal. Data information from the drop test of solid rocket motor is similar to the results of finite element analysis. The rationality of the calculation method is verified.

Failure Criterion Related to Temperature for HTPB Propellant

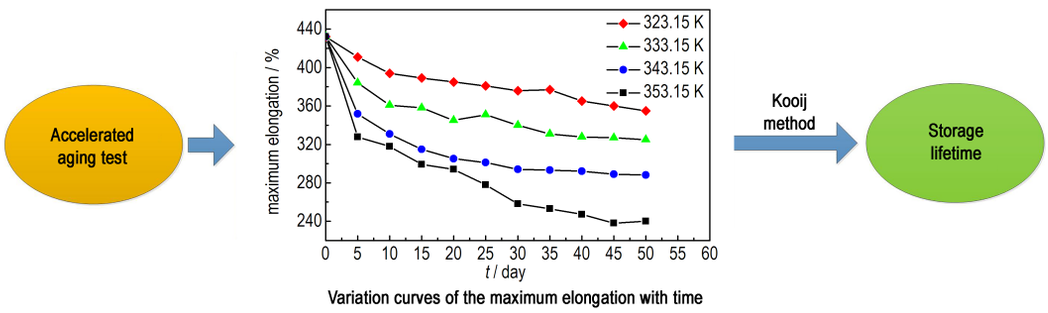


LI Hui, XU Jin-sheng, ZHOU Chang-sheng, CHEN Xiong, ZHENG Jian

***Chinese Journal of Energetic Materials*,2018,26(9):732-738**

Based on cumulative damage theory and linear viscoelastic theory, the failure criterion of HTPB propellant which considers the temperature and strain rate is established to predict the damage evolution properties and failure time at different temperatures and strain rates.

Storage Lifetime Prediction of HTPB Coating in Solid Rocket Motor Based on Kooij Method

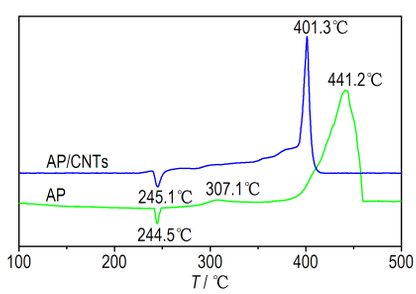


Variation curves of the maximum elongation with time

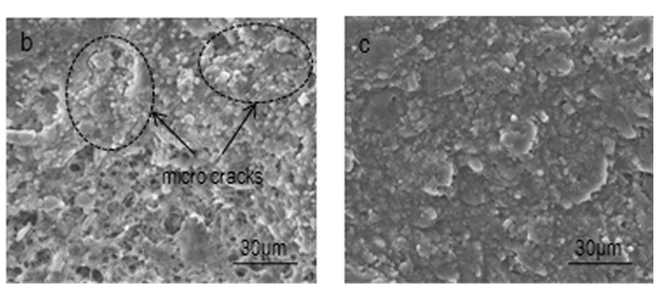
LI Ke, ZHENG Jian, ZHI Jian-zhuang, WU Guo-rui
Chinese Journal of Energetic Materials, **2018,26(9):739-743**

Accelerated aging tests at 50, 60, 70 ℃ and 80 ℃ were conducted, and the maximum elongation of the aging HTPB coating was tested. The experimental data were used to solve the Kooij model, which predicted the storage life time of HTPB coating at 25 ℃.

Effects of Carbon Nanotubes (CNTs) on the Combustion and Mechanical Properties of AP/CMDB Propellant



DSC curves of AP and AP/CNTs

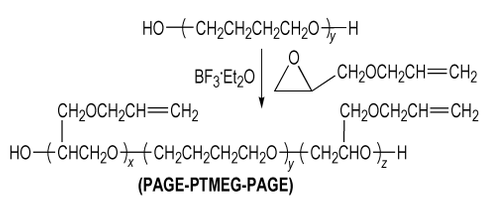


SEM images of AP-CMDB propellant without (b) and with (c) 0.5% CNTs

ZHANG Zheng-zhong, DENG Chong-qing, LI Ji-zhen, LIU Xiao-jun, TANG Qiu-fan
Chinese Journal of Energetic Materials, **2018,26(9):744-748**

The effects of CNTs on the thermal decomposition properties of the main components of AP/CMDB propellant and the microstructure of AP/CMDB propellant were studied by DSC and SEM. The effects of CNTs on the combustion and mechanical properties of AP/CMDB propellant were investigated.

Synthesis and Characterization of Hydroxyl-terminated Block Copolyether of PAGE-PTMEG-PAGE

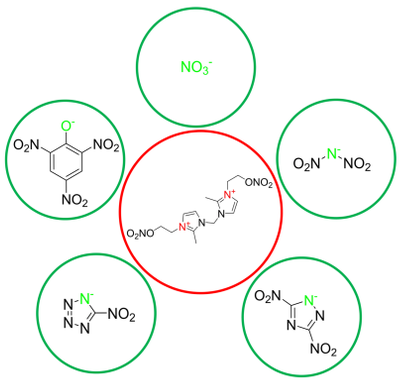


(PAGE-PTMEG-PAGE)

MO Hong-chang, WANG Xiao-chuan, XU Ming-hui, LU Xian-ming, LI Xiao-jiang, WANG Wei
Chinese Journal of Energetic Materials, **2018,26(9):749-752**

The hydroxyl-terminated triblock copolyether of PAGE-PTMEG-PAGE was synthesized by the cationic ring-opening polymerization of allyl glycidyl ether in the presence of the hydroxyl-terminated polytetrahydrofunan as initiator, boron-trifuoride ethylether complex ($BF_3 \cdot OEt_2$) as catalyst. The copolyether was characterized by IR, ^1H NMR, ^{13}C NMR, GPC and DSC.

Synthesis and Properties of Bis-cationic Imidazolium Energetic Salts

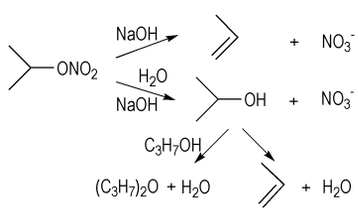


A series of bis-cationic imidazolium energetic salts were synthesized by bridging, quaternization, nitration, and metathesis reactions, most of which have better thermal stabilities and detonation performances than the corresponding mono-cationic energetic salts.

LEI Jian-lei, NING Hong-li, HU Gang, SU Ke, YANG Hai-jun

Chinese Journal of Energetic Materials,2018,26(9):753-759

Hydrolysis Process of Isopropyl Nitrate Catalyzed by NaOH

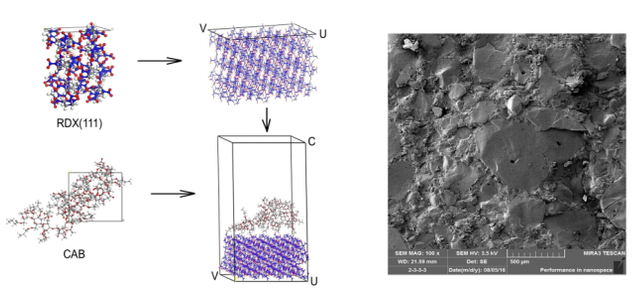


The hydrolysis of isopropyl nitrate catalyzed by sodium hydroxide was studied for optimum conditions and its hydrotion mechanism was investigated.

ZHENG Zhan-sheng, XIAO Yong, SUN Tao, YU Chuan-ming, PENG Hui, LIU Cheng, HU Bing-cheng

Chinese Journal of Energetic Materials,2018,26(9):760-764

Effect of Functional Additives on Interface Bonding Strength of DNAN/RDX Melt-cast Explosives

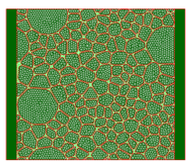


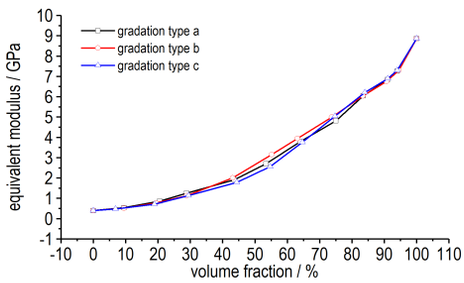
To improve the mechanical property of DNAN / RDX melt-cast explosives, the effect of MNA, Tween 60, CEF and CAB on the interfacial binding energy was simulated by molecular dynamics. The powder contact angle method and platinum plate method were used to measure the contact angle and surface tension, and the simulation results were verified by calculating the adhesion work. The experiments of adhesion work were verified from macroscopic and microscopic scales by Brazilian experiments and scanning electron microscopy (SEM), respectively.

MENG Jun-jiong, ZHOU Lin, JIN Da-yong, NIU Lei, WANG Qin-hui

Chinese Journal of Energetic Materials,2018,26(9):765-771

A Method of Generating Mesoscopic Models for PBXs with High Particle Volume Fraction



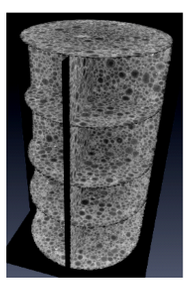


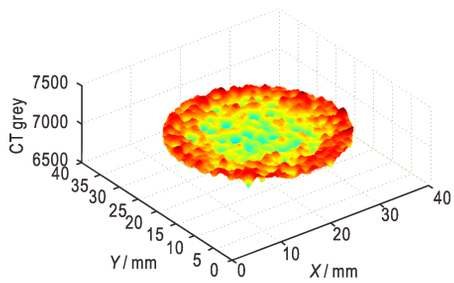
The concept of gradation of Monte Carlo method was introduced into the PBX model of high volume fraction. A generating method of Voronoi polygon particles which can consider the distribution of graded particles was formed by combining the Voronoi polygon particle generation algorithm. A PBX meso structure model considering gradation and volume fraction was established through the treatment of particle modification, shrinking, corner cutting and smoothing etc. The uniaxial compression simulation for PBX meso model of three groups under different gradation condition was performed by NMM. The reasons of deviation occurred between the simulation results and the experimental ones were analyzed, and the rationality of the PBX meso structure model generation method was discussed.

KANG Ge, CHEN Peng-wan, ZENG Yi-lun, NING You-jun

Chinese Journal of Energetic Materials,**2018,26(9):772-778**

X-ray Microtomography of TATB Granules Under Isostatic Warm Compaction



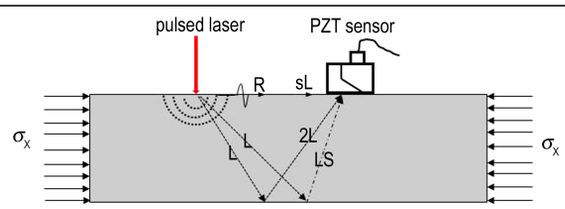


Three dimensional visualization of 2, 4, 6-triamino-1, 3, 5-trinitrobenzene (TATB) molding powder under isostatic warm compaction was performed using X-ray microtomography (X-μCT). It allows a quantitative analysis of the compacted granules, including the size distribution and CT value variance in different slices.

ZHANG Wei-bin, TIAN Yong, YONG Lian, YANG Xue-hai, DAI Bin, LI Jing-ming, CHEN Hua

Chinese Journal of Energetic Materials,**2018,26(9):779-785**

Study on Detection Method of Internal Stress in PBX Simulated Material by Laser Ultrasonic Skimming Surface Longitudinal Wave

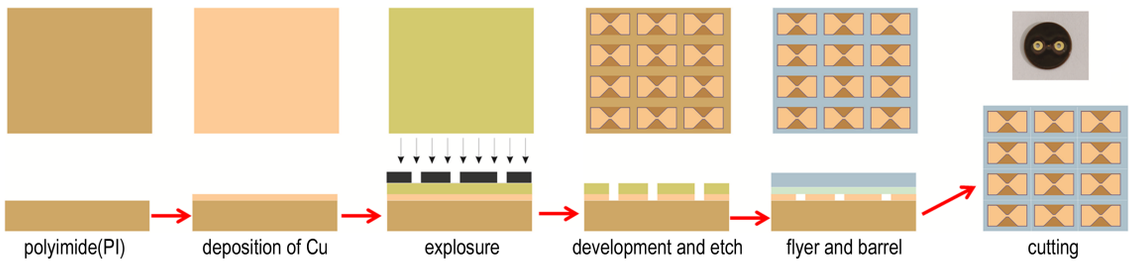


A new method based on laser ultrasonic skimming surface longitudinal wave was studied for stress nondestructive testing in PBX material. The relationship between the stress amplitude and relative change in the wave velocity is acquired by experiment.

ZHOU Hai-qiang, PEI Cui-xiang, LIU Wen-wen, YI Dong-chi, YANG Zhan-feng

Chinese Journal of Energetic Materials,**2018,26(9):786-790**

Performance of Integrated Exploding Foil Energy Conversion Unit Based on FPC

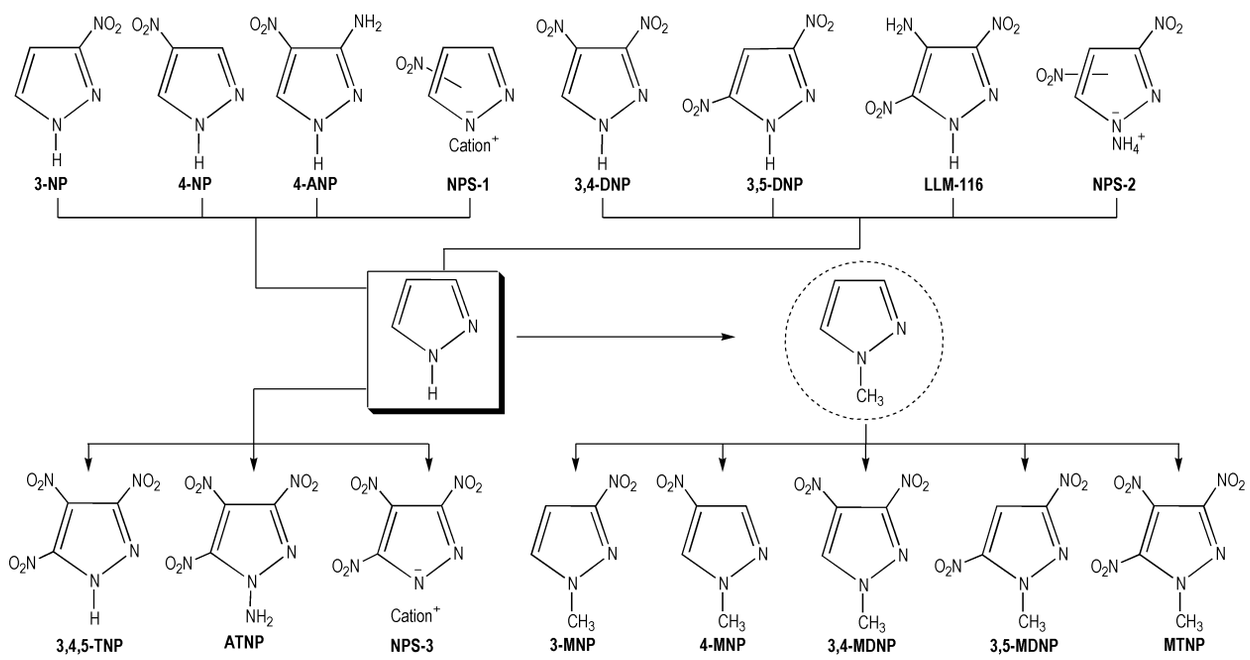


GUO Fei, LÜ Jun-jun, WANG Yao, FU Qiu-bo, HUANG Hui, SHEN Rui-qi

Chinese Journal of Energetic Materials, **2018, 26(9): 791−795**

Exploding foil energy conversion unit based on Flexible Printing Circuit process was designed and fabricated. Meanwhile, electrical explosion performance, driving flyer capability and initiating HNS-Ⅳ capability of the new integrated exploding foil energy conversion unit were studied.

Research Progress in Synthesis, Properties and Applications of Nitropyrazoles and Their Derivatives



PAN Yong-fei, WANG Ying-lei, ZHAO Bao-dong, GAO Fu-lei, CHEN Bin, LIU Ya-jing

Chinese Journal of Energetic Materials, **2018, 26(9): 796−812**

The research progress of nitropyrazole and its derivatives in recent years was briefly reviewed from the aspects of synthesis, properties and applications, and the development direction and trend of the research on the synthesis of nitropyrazole and its derivatives were combed.