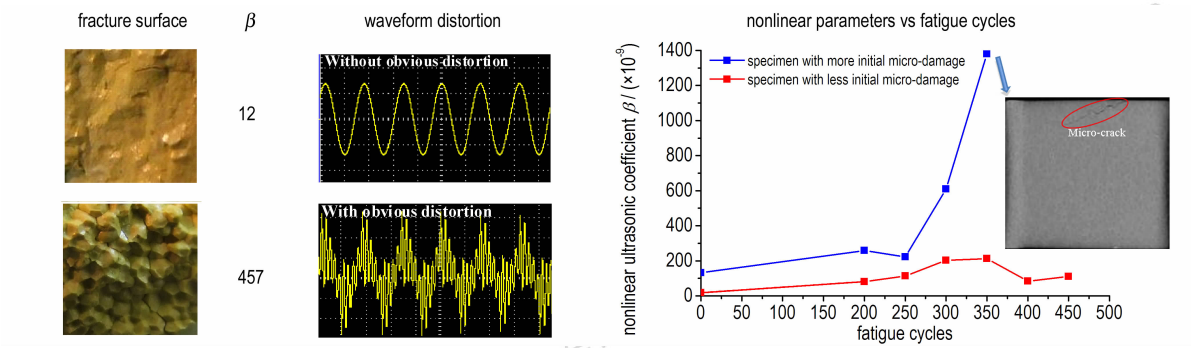
Detection of Micro-damages in TATB-based Polymer Bonded Explosive by Nonlinear Ultrasonic Technique

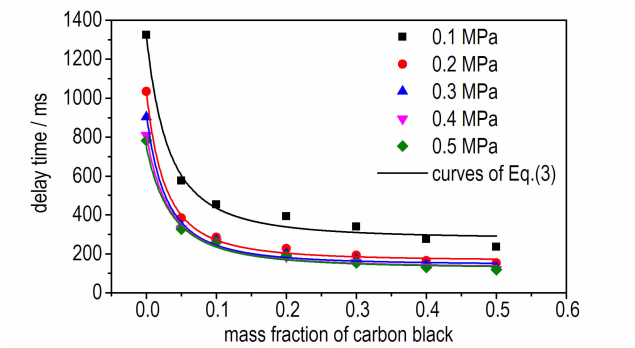


YANG Zhan-feng, TIAN Yong, ZHOU Hai-qiang, ZHANG Wei-bin, LI Jing-ming, LI Wei-bin

Chinese Journal of Energetic Materials, 2017, 25(12): 970–975

The objective of this work is to obtain the relationship of micro-damages and nonlinear ultrasonic parameters of TATB-based PBX.

Effects of Carbon Black Content on Ignition and Combustion Performance of Polyethylene at Different Environmental Pressures

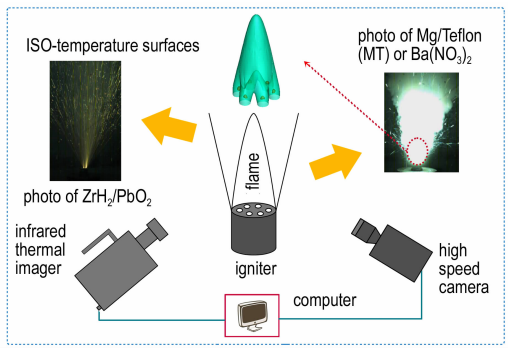


YANG Hai-tao, CHEN Xiong, XIANG Heng-sheng, GONG Lun-kun, HUANG Bo

Chinese Journal of Energetic Materials, 2017, 25(12): 976–982

The effect of mass fraction of carbon black on the ignition and combustion characteristics of polyethylene under different environmental pressure was studied. The ignition process, ignition delay time and burning rate of solid fuels under different environment pressure were discussed. Based on experimental data, mathematical relationship between ignition delay time and mass fraction of carbon black was given by using the least squares method.

Combustion Flame Expansion Characteristics of Base-bleed Igniter in the Atmosphere

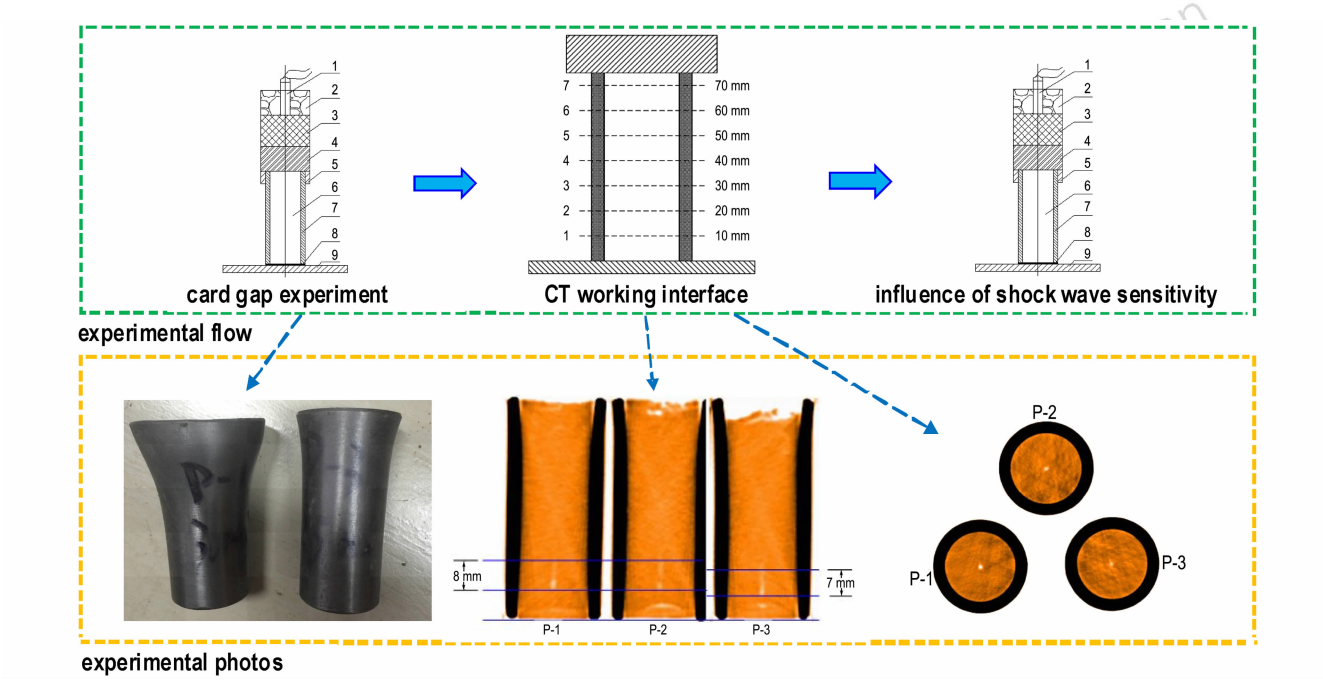


MA Long-ze, YU Yong-gang

Chinese Journal of Energetic Materials, 2017, 25(12): 983–990

The influence of different ignition agents and orifice diameters on the combustion and expansion characteristics of the base bleed igniter burning in the atmosphere was experimentally evaluated by HSC and ITI analysis. A three-dimensional simulation of the burning jet of MT igniter was conducted.

Damage Characteristics of Two HMX-based Anti-overloaded Explosives under Shock Loading

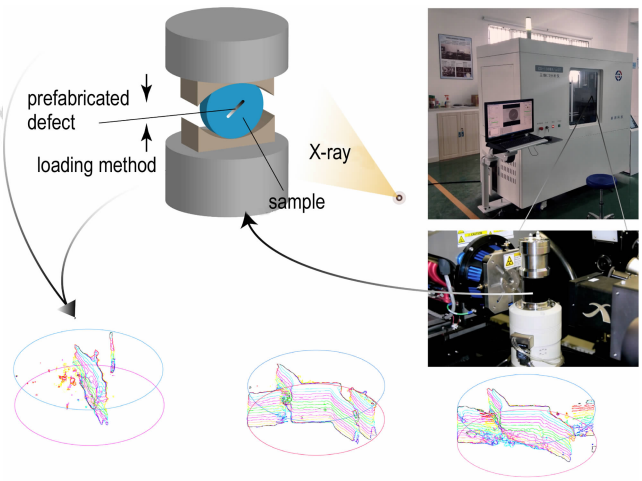


JIANG Xi-bo, JIN Peng-gang, WANG Jian-ling, YANG Jian, WANG Xiao-feng

Chinese Journal of Energetic Materials, 2017, 25(12): 991–996

Two kinds of HMX-based anti-overloaded explosives by casting moulding and pressed fitting were chosen to study the damage characteristics and damage failure mechanisms of explosives under overloaded conditions by shock loading. The shock damage was conducted based on shock wave sensitivity test. The damage characteristics of samples before and after shock loading were studied by CT and the shock wave sensitivity was also tested after damage.

In-Situ X-Ray Tomography Observation of Damage Evolution in PBX Mock Materials with Prefabricated Defects

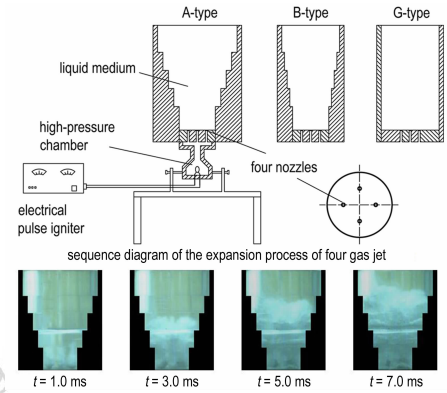


YUAN Zeng-nian, CHEN Hua, DAI Bin, ZHANG Wei-bin, LI Jing-ming

Chinese Journal of Energetic Materials, 2017, 25(12): 997–1003

In-situ X-ray tomography studies were performed using the improved arc compress head Brazilian test on three groups of PBX mock material samples, including the intact sample, sample with oblique 45° non-through defect and sample with oblique 45° through defect, in which the purpose of prefabricated defects is to simulate the initial damages.

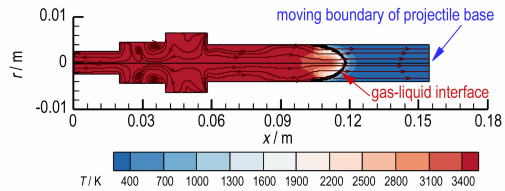
Experimental Study on Expansion Characteristics of Four Combustion-gas Jet in Bulk-loaded Liquid



To explore the method of controlling the combustion stability of bulk-loaded propellant guns, we design the experiment to study the expansion characteristic of four combustion-gas jets in five-stage cylindrical stepped-wall type observation chamber with different parameters.

FENG Bo-sheng, XUE Xiao-chun
Chinese Journal of Energetic Materials,2017,25(12): 1004–1010

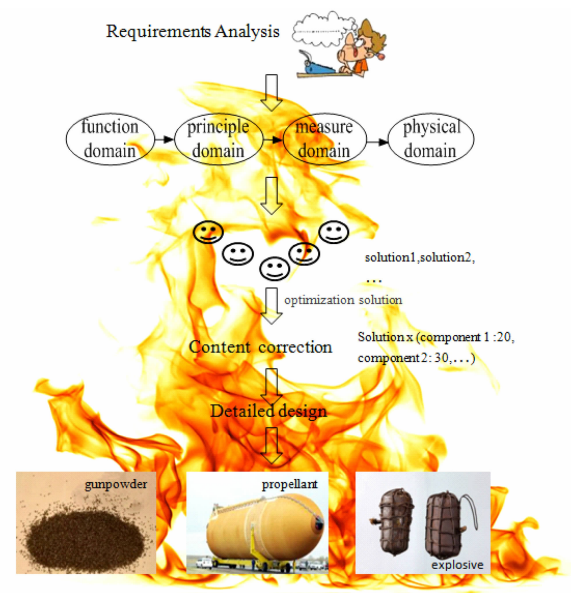
Simulation of Gas-liquid Reaction Flow Field for Combustion and Propulsion Processes of Bulk-loaded Energetic Liquid



A turbulent gas-liquid chemical reaction flow model for the combustion and propulsion processes of the bulk-loaded LP1846 was developed and tested by firing experiments.

MANG Shan-Shan, YU Yong-gang
Chinese Journal of Energetic Materials,2017,25(12): 1011–1017

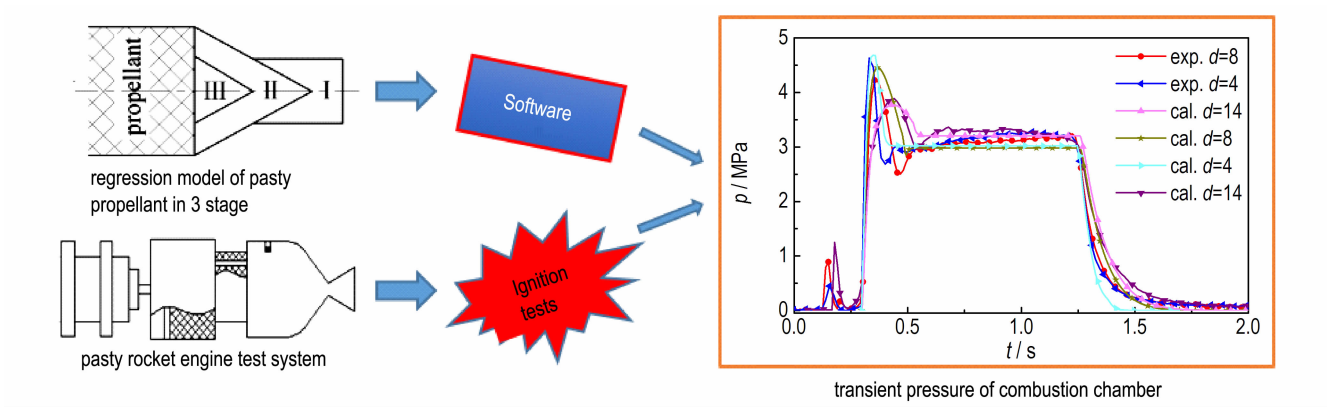
Computer-aided Conceptual Design Method of Double-base Solid Propellant Formulation



The conceptual design method and model of double-base solid propellant formulation based on QFD and AD are proposed. The formulation evaluation method and the study of content correction method are introduced. A conceptual design system of double-base solid propellant formulation is realized, and has an experimental proof of formulation, which verifies the effectiveness of the double-base solid propellant formulation conceptual design model.

DONG Wen-jing, ZHAO Hong-an, GENG Guo-hua, LI Man-rong
Chinese Journal of Energetic Materials,2017,25(12): 1018–1024

Ignition Characteristics of Pasty Propellant Rocket Engine

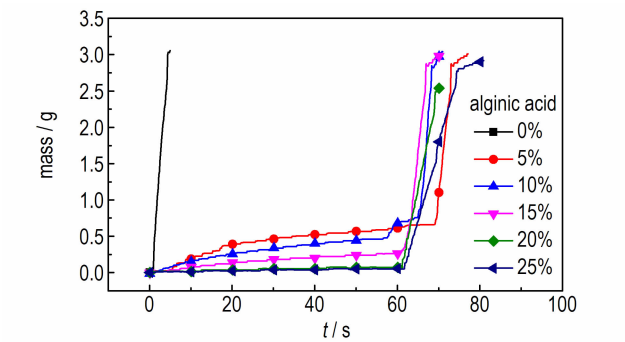


YE Xiao-bing, CHEN Xiong, SHAN Xin-you, ZHOU Chang-sheng, QIN Zhen-yang

Chinese Journal of Energetic Materials, 2017, 25(12): 1025–1030

The burning surface change model of pasty propellant was built to study the ignition operating characteristics of the pasty propellant rocket engine, and regression equations of pasty propellant were deduced in each stage. The ignition tests were carried out successfully based on a pasty propellant rocket launch test system, and the ignition characteristics of the rocket engine in each stage were analyzed.

Experimental Investigation on Electrorheological Characteristics of UDHM Suspension

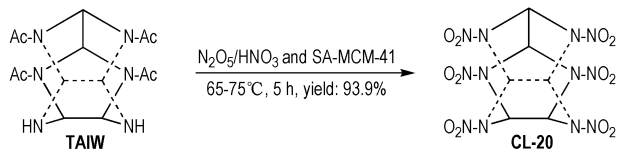


WU Guan-jie, HU Song-qi, LIU Ling-yi, REN Quan-bin, YU Xiu-li, HU Sheng-chao, GAO Feng, ZHANG Jiao-qiang

Chinese Journal of Energetic Materials, 2017, 25(12): 1031–1036

The electrorheological characteristics of dimethyl hydrazine (UDHM) suspension were studied by using the electrorheological characteristics test system. By the change in electric field intensity and alginic acid medium contents, the electrorheological characteristics of UDMH suspension were analyzed.

Synthesis of CL-20 by MCM-41 Molecular Sieve of Perfluorosulfonic Acid

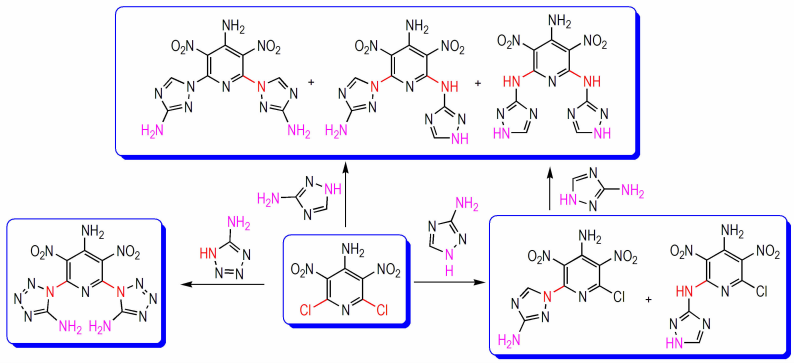


SHI Lei, YANG Chao-fei, QIAN Hua, REN Li-ping, LIU Da-bin, PAN Ren-ming

Chinese Journal of Energetic Materials, 2017, 25(12): 1037–1041

In order to improve the low yield of CL-20 and solve the difficult recovery of the catalyst, perfluorinated (1-methyl-ethane) sulfonic acid was grafted onto pure MCM-41 mesoporous molecular sieves to prepare the catalyst of perfluorosulfonic acid MCM-41 molecular sieve (SA-MCM-41). The catalyst was applied in the nitration of TAIW to CL-20 using N_2O_5/HNO_3.

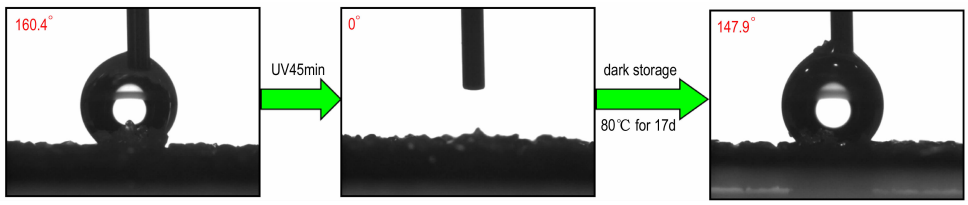
Synthesis and Properties of 4-Amino-2,6-bis(5-amino-1*H*-tetrazol)-3,5-dinitropyridine



4-Amino-2, 6-bis (5-amino-1*H*-tetrazol)-3, 5-dinitropyridine was synthesized by the reaction between 5-amino-1*H*-tetrazole and 4-amino-2,6-dichloro-3,5-dinitropyridine (ADDP). However, when 3-amino-1, 2, 4-triazole was reacted with ADDP, two or three intermediates with the same molecular mass were obtained, which were hard to isolate and purify.

ZHOU Jiu-jiu, MA Cong-ming, LIU Zu-liang, YAO Qi-zheng
***Chinese Journal of Energetic Materials*,2017,25(12): 1042–1045**

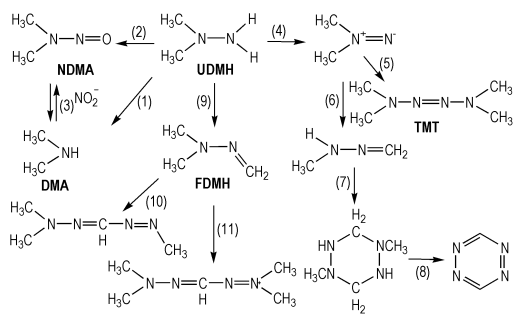
Prepareation of HMX/TiO_2 Composites and Its Reversible Wettability



Octogen (HMX)/TiO_2 composites with reversible wettability were prepared by electrostatic deposition method and then modified by hexadecyltrimethoxysilane to improve the compatibility of HMX to liquid bonding agents. The morphology, polymorph of HMX/TiO_2 composites and the element content on the surface of HMX/TiO_2 composites were tested by scanning electron microscope (SEM), X-ray diffraction (XRD) and X-ray photoelectron spectroscope, respectively.

XIAO Chun, ZHU Qing, XIE Xiao, LIU Tao, LUO Guan, LI Shang-bin
***Chinese Journal of Energetic Materials*,2017,25(12): 1046–1050**

Intermediate Products of Unsymmetrical Dimethylhydrazine Catalytic Degradation by UV-Vis Spectroscopy



The two oxidative systems of Cu^{2+}/H_2O_2 and Fe^{2+}/H_2O_2 are adopted to degrade UDMH, and the impacts of the four factors: pH value, temperature, time and oxidant amount on the degradation rate of UDMH are studied.

BU Xiao-yu, LIU Xiang-xuan, LIU Bo, WANG Xuan-jun
***Chinese Journal of Energetic Materials*,2017,25(12): 1051–1056**