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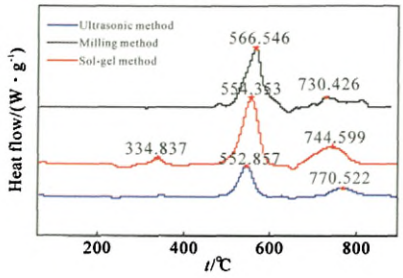
A Review on Organic Anion Based Energetic Salts

HUANG Hai-feng, ZHOU Zhi-ming

Chinese Journal of Propellants & Explosives, 2012, 35(3):1-10.

The energetic salts have been the focus in the development of high energy density materials and a large number of new energetic salts have been documented. The energetic salts based on organic anion were reviewed.

Effects of Preparation Method on the Properties of Al/Fe_2O_3 Nano-thermites

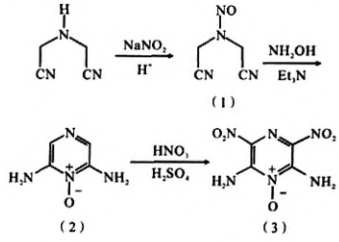


GAO Kun, LUO Yun-jun, LI Guo-ping, WANG Lu, ZHENG Jian

Chinese Journal of Explosives & Propellants, 2012, 35(3):11-14.

Al/Fe_2O_3 nano-thermites were prepared by using ultrasonic, mechanical milling and sol-gel methods, respectively. The influence of preparation method on the structures and properties of the final thermites such as crystal structure, particle size, morphology, surface area and thermal performances, were studied.

Synthesis of 2,6-Diamino-3,5-dinitropyrazine-1-oxide

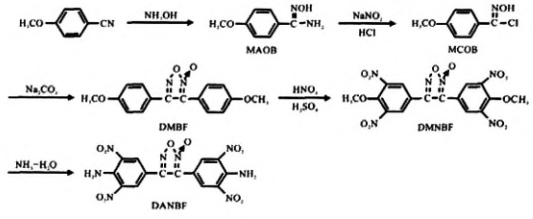


ZHAO Xiao-feng, LIU Zu-liang, YAO Qi-zheng, CHENG Jian, DONG Yan

Chinese Journal of Explosives & Propellants, 2012, 35(3):15-17.

A new synthetic method using iminodiacetonitrile as the starting material in three steps including nitrosylation, cyclization and nitration was designed to prepare 2, 6-diamino-3, 5-dinitropyrazine-1-oxide (LLM-105).

Synthesis and Thermal Performance of 3,4-Bis(4′-amino-3′, 5′-dinitrobenzene-1′-yl)furoxan

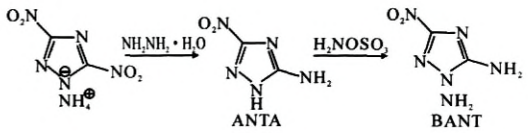


LI Ya-nan, ZHANG Zhi-zhong, LIAN Peng, WANG Bo-zhou, YANG Wei, WANG You-bing, LI Hui

Chinese Journal of Explosives & Propellants, 2012, 35(3):18-22.

3,4-bis(4′-amino-3′, 5′-dinitrobenzene-1′-yl) furoxan was synthesized using 4-methoxybenzonitrile as starting material through six steps′ reactions of oxime, diazotization, denitrification, cyclization, nitration and amination. The structures of intermediates and title compound were characterized and the thermal performance of title compound was investigated.

Synthesis, Characterization and Crystal Structure of 1, 5-Diamino-3-nitro-1, 2, 4-triazole

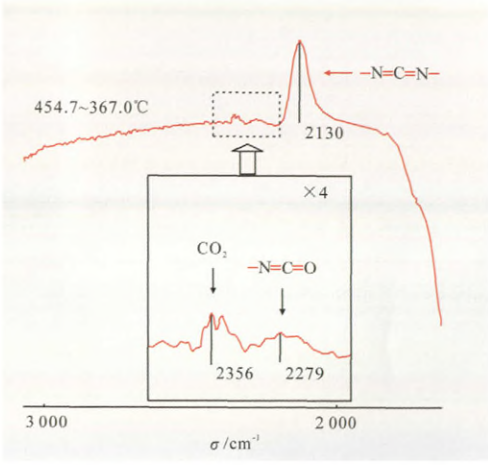


JIA Si-yuan, WANG Bo-zhou, HAO Cheng-gang, ZHANG Hai-hao, ZHOU Qun, WANG Xi-jie

Chinese Journal of Explosives & Propellants, 2012, 35(3): 23-26.

A novel energetic compound 1, 5-diamino-3-nitro-1, 2, 4-triazole (BANT) was synthesized by reduction and animation using ammonium salt of 3, 5-dinitro-1, 2, 4-triazole as starting material with a yield of 64%, and its structure was confirmed by the means of IR, ^{1}HNMR, ^{13}CNMR, MS and elemental analyses.

IR Spectroscopic Study on the Thermal Decomposition of Thermal Decomposition Residues of Hexanitrohexaazaisowurtzitane (HNIW)

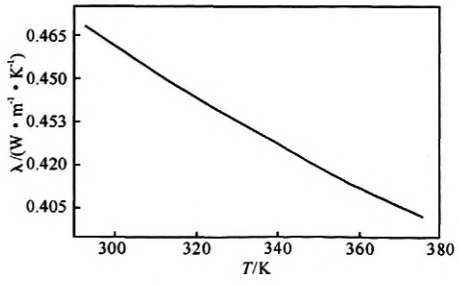


XIAO He-miao, YANG Rong-jie, ZENG Ji-chao, PAN Qing, CHEN Zhi-qun, JIN Jun-mei

Chinese Journal of Explosives & Propellants, 2012, 35(3): 27-32.

The forming condition and reaction mechanism of carbodiimide (−N=C=N−) in the processes of the second thermal decomposition of HNIW thermal decomposition residues of residues with mass loss of 91.8% and 90.1% were studied by TG-DSC and FTIR.

Influence of Temperature on Thermal Eexpansion Coefficient and Tthermal Conductivity of HMX Based Polymer Bonded Explosive

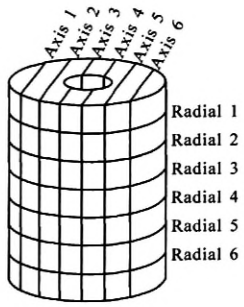


WEI Xing-wen, ZHOU Xiao-yu, WANG Pei, TU Xiao-zhen, WANG Xi

Chinese Journal of Explosives & Propellants, 2012, 35(3): 33-37.

The effect of temperature on thermal expansion coefficient and thermal Conductivity of the HMX based polymer bonded explosive (PBX) were investigated.

Development of Reference Material for Measuring the Heat of Detonation of Non-ideal Explosive

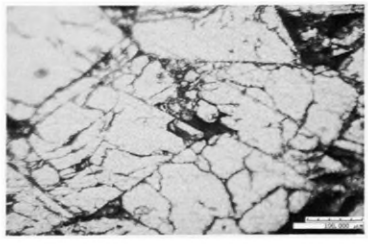


WANG Cai-ling, WANG Kun, FENG Xiao-jun, ZHAO Sheng-xiang, DIAO Xiao-qiang, DAI Zhi-xin

Chinese Journal of Explosives & Propellants, 2012, 35(3): 38-41.

A reference material, mainly composed of RDX and Al, was developed for verifying calorimeter used to determine the heat of detonation of non-ideal explosive. The homogeneity of characteristic value of the reference materials tested by means of the variance analysis method and its stability has been examined in regular order. The value of the heat of detonatiom was tested by an adiabatic calorimeter and a constant-temperature calorimeter, respectively.

Crack and Damage in Insensitive HMX Crystal during Pressing



LIU Jia-hui, LIU Shi-jun, HUANG Ming, LI Hong-zhen, NIE Fu-de

Chinese Journal of Explosives & Propellants, 2012, 35(3): 42-46.

Three kinds of insensitive HMX crystals with different particle size were chosen to analyze their change of microstructure and particle size distribution after being pressed.

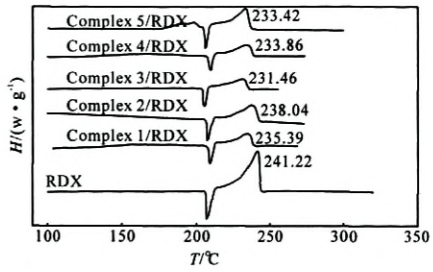
Thermal Behavior of Boron Metallized RDX-based Explosives

REN Xiao-ning, SHAO Ying-hui, LIU Zi-ru, ZHAO Feng-qi, ZHANG Gao, FENG Xue-song, HEN Shu-yun

Chinese Journal of Explosives & Propellants, 2012, 35(3): 47-51.

The thermal behavior of various metallized RDX-based explosives with boron powder has been investigated by a thermogravimetric analyzer (TG-DTG) and a high pressure differential scanning calorimeter (PDSC). The effects of the ingredients on thermal decompositions of the metallized explosives have been studied. The kinetic parameters, apparent activation energies and pre-exponential factors were calculated.

Effects of Transition Metal 5,5'-azoterazolate Energetic Complexes on Thermal Decomposition Behaviours of RDX and HMX

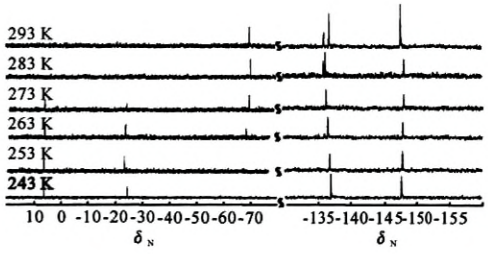


JIAO Bao-juan, YAN Zhi-jun, CHEN San-ping

Chinese Journal of Explosives & Propellants, 2012, 35(3): 52-54.

The effects of five transition metal 5,5'-azoterazolate energetic complexes $MATZ(H_2O)_n$ (M=Mn, Ni, Zn, n=6; M=Co, Pb, n=3; ATZ=5,5'-azoterazolate) act on the thermal decomposition behavior of RDX and HMX were investigated with DSC technique.

Synthesis, Characterization and Decomposition Reaction Mechanism of ^{15}N-Labelled Phenylpentazoles

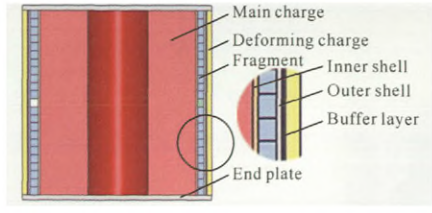


WANG Min-chang, BI Fu-qiang, ZHANG Gao, XU Min, GE Zhong-xue, CHEN Zhi-qun, FAN Xue-zhong, XU Cheng, QI Zhu-chai

Chinese Journal of Explosives & Propellants, 2012, 35(3): 56-60.

Using ^{15}N-labelled $NaNO_2$ and NaN_3 as starting materials, *p*-methoxyphenylpentazole (*p*-MOPP) and *p-tert*-butylphenylpentazole (*p*-tBPP) were synthesized and characterized at low temperature.

Matching of Deformation Control Parameters of Deformable Warheads

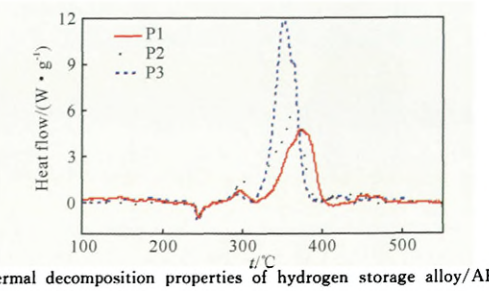


YANG Ya-dong, LI Xiang-dong, YE Xiao-jun, LI Zhan-qi

Chinese Journal of Explosives & Propellants, 2012, 35(3): 61-65.

The deforming processes of deformable warhead were numerically simulated. The influence of the parameters such as the phase angle of deforming charge, thickness of the deforming charge and deformation time on the deforming processes were studied.

Thermal Decomposition Properties of Hydrogen Storage Alloy/AP/HTPB Propellants

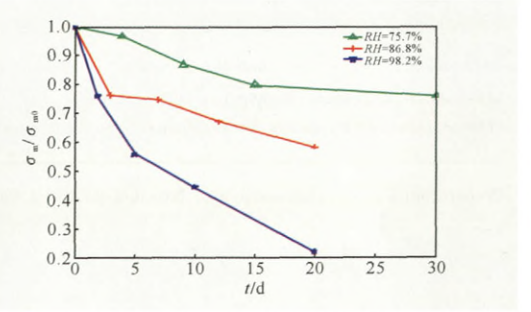


DOU Yan-meng, LUO Yun-jun, LI Guo-ping, XIA Min, GE Zhen

Chinese Journal of Explosives & Propellants, 2012, 35(3): 66-70.

Thermal decomposition properties of hydrogen storage alloy/AP/HTPB propellants are studied by TG-DTG, DSC and kinetics analysis methods.

Effect of Moisture Ageing on Mechanical Performance of HTPB Propellant

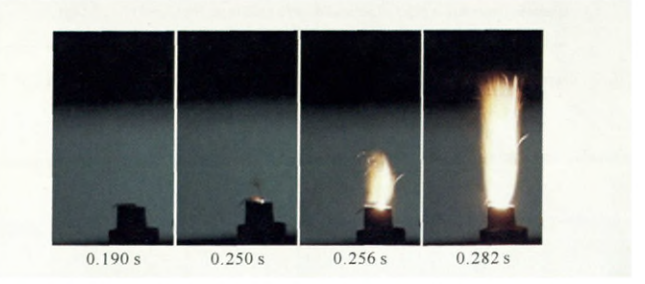


ZHANG Xu-dong, DONG Ke-hai, QU Kai, SUI Yu-tang, GUO Lei

Chinese Journal of Explosives & Propellants, 2012, 35(3): 71-74.

Some moisture ageing tests have been done to HTPB propellant under the conditions of three temperatures and different relative humidity. Mechanical performance tests have been done for the moisture ageing samples. The moisture ageing mechanism has been researched basing on these tests.

Radiative Ignition of AP/HTPB Composite Propellant

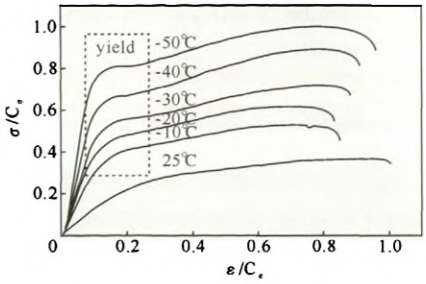


GONG Lun-kun, WANG Zheng-shi, JU Yu-tao, ZHU Guo-qiang, CAO Jie

Chinese Journal of Explosives & Propellants, 2012, 35(3): 75-79.

The ignition process of AP/HTPB composite propellant was investigated by CO_2-laser radiation in air(with ambient pressure). An one-dimensional heat transfer model describing the physical and chemical phenomena occuring in solid propellant was used to investigate the ignition characteristics. The ignition criterion was obtained with least square method.

Low Temperature Mechanical Properties of HTPB Propellant



LAI Jian-wei, CHANG Xin-long, LONG Bing, SUN Tao, FANG Peng-ya, ZHANG You-hong

Chinese Journal of Explosives & Propellants, 2012, 35(3): 80-83.

The uniaxial tensile tests of HTPB propellant were carried out at low temperature after short term storage at low temperature. The stress-strain plots for HTPB propellants under the various temperature conditions are obtained.

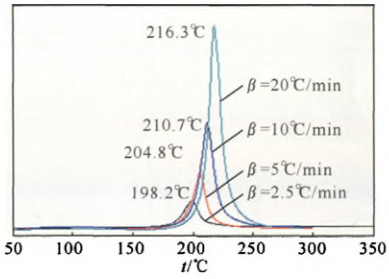
Combustion Characteristics of Smokeless CMDB Propellants Containing N,N′-dinitropiperazine

LIU Fang-li, LI Ji-zhen, QI Xiao-fei, SONG Zhen-wei

Chinese Journal of Explosives & Propellants, 2012, 35(3): 84-87.

The burning rate of CMDB propellants containing DNP could be decreased obviously. The burning rate of CMDB propellant at the pressure of 18 MPa was reduced by 68% when RDX was completely replaced by DNP.

Preparation and Characterization of Nitrated Bacterial Cellulose

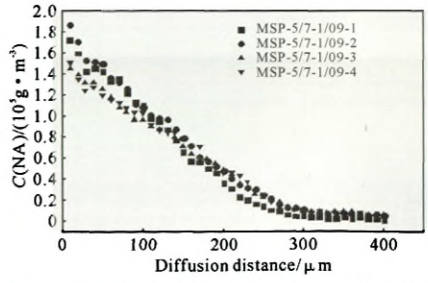


YANG Qiang, PENG Bi-hui, LIANG Gang, LUO Qing-ping, PEI Chong-hua

Chinese Journal of Explosives & Propellants, 2012, 35(3): 88-90

Nitrated bacterial cellulose (NBC) was synthesized by nitro-sulfric acid method, bacterial cellulose(BC) as the raw material. The thermal decomposition activation energy was calculated by differential scanning calorimetry results.

Application of a Novel Deterrent Polyester in Gun Propellant



WEI Lun, YU Hui-fang, HAN Bing, WANG Feng, LIU Bo, LI Da, LIU Guo-tao, CHEN Teng

Chinese Journal of Explosives & Propellants, 2012, 35(3): 91-94.

A novel deterrent polyster was applied to gun propellant. The properties of stastic burning and anti-duffusion for propellant containing the polyster were studies by using the physical-chemistry testing, the closed bomb tests and long-term accelerated aging storage.

Contents