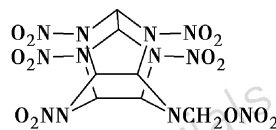


Nitrolysis of 3,5,9,11-Tetraacetyl-14-oxo-1,3,5,7,9,11-hexaazapentacyclo[5.5.3.0^{2,6}.0^{4,10}.0^{8,12}]pentadecane

SUN Cheng-hui, ZHAO Xin-qi

Chinese Journal of Energetic Materials, 2009, 17(1): 1–3



A novel hexaazaisowurtzitane derivative containing nitramine and nitrate ester groups was synthesized.

Synthesis Technique of 2-Methyl-6-nitroaniline

QI Lei, PANG Si-ping, SUN Cheng-hui

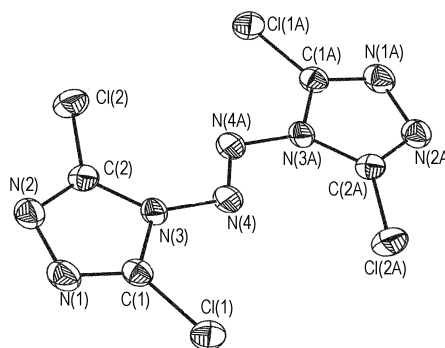
Chinese Journal of Energetic Materials, 2009, 17(1): 4–6

The synthesis technology of 2-methyl-6-nitroaniline was investigated.

Synthesis and Crystal Structure of 2,2',5,5'-Tetrachloro-1,1'-azo-1,3,4-triazole

LI Sheng-hua, SHI Hong-gang, SUN Cheng-hui, LI Xiao-tong, PANG Si-ping, YU Yong-zhong, ZHAO Xin-qi

Chinese Journal of Energetic Materials, 2009, 17(1): 7–10



2,2',5,5'-tetrachloro-1,1'-azo-1,3,4-triazole was synthesized by the reaction of 4-amino-1,2,4-triazole and sodium dichloroisocyanurate (SDCI). Its structure was determined by X-ray single crystal diffraction.

Preparation and Properties of TOATF

LI Wei-wen, LI Zhan-xiong, WANG Wan-jun

Chinese Journal of Energetic Materials, 2009, 17(1): 11–13

3,4,7,8:11,12:15,16-tetrafurazano-1,2,5,6,9,10,13,14-octaazacyclohexadeca-1,3,5,7,9,11,13,15-octaene-1,5,9,11-tetraoxide (TOATF) was synthesized as macrocyclic compound via two-step oxidation reaction. The thermal stability and the compatibility of TOATF with RDX and HMX was studied using TG and DSC technique respectively.

Preparation of 2,4-Dinitrotoluene with NO₂

SHI Hong-xin, GAO Li-ding, WU Hong-ke, LIU Qiu-ping

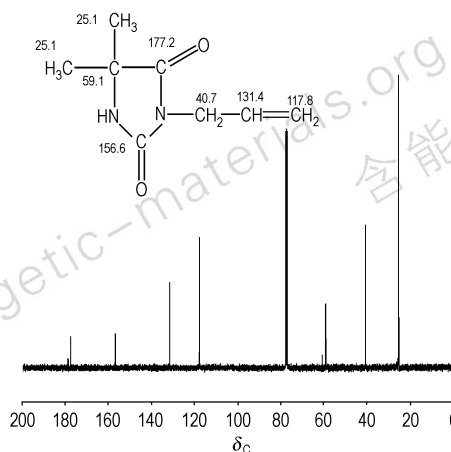
Chinese Journal of Energetic Materials, 2009, 17(1): 14–18

2,4-Dinitrotoluene was synthesized by NO₂/O₂ in autoclave. Effects of reaction conditions on the conversion of toluene, the yield of dinitrotoluene (DNT) and the ratio of 2,4-DNT to 2,6-DNT were investigated. The activities of catalysts, such as H β , Na β , CH₃SO₃H and H β -CH₃SO₃H, were studied. Toluene nitration with NO₂/O₂ is a green synthesis method.

Synthesis and Characterization of 3-Allyl-5,5-dimethylhydantoin

ZHANG Li-na, YANG Rong-jie

Chinese Journal of Energetic Materials, 2009, 17(1): 19–22



A new bonding agent, 3-allyl-5,5-dimethylhydantoin (ADMH) was synthesized by the Gabriel method, and characterized by ^{13}C NMR.

Effect of Drying Methods on Structure of RDX/RF Composite Energetic Materials

ZHANG Juan, NIE Fu-de, YU Wei-fei,

GUO Qiu-xia, ZENG Gui-yu

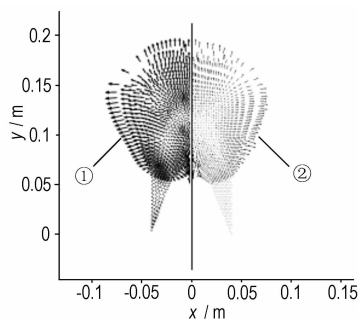
Chinese Journal of Energetic Materials, 2009, 17(1): 23–26

Hexahydro-1,3,5-trinitro-1,3,5-triazine/resorcinol-formaldehyde (RDX/RF) aerogel and xerogel were prepared by supercritical fluid drying method and freezing drying method. The structures of RDX/RF composites were characterized by scanning electron microscopy (SEM), BET method, X-ray power diffraction (XRD) and differential scanning calorimetry (DSC).

Numerical Simulation of High Explosive Detonation Process Using SPH Method with Fully Variable Smoothing Lengths

QIANG Hong-fu, WANG Kun-peng, GAO Wei-ran

Chinese Journal of Energetic Materials, 2009, 17(1): 27–31



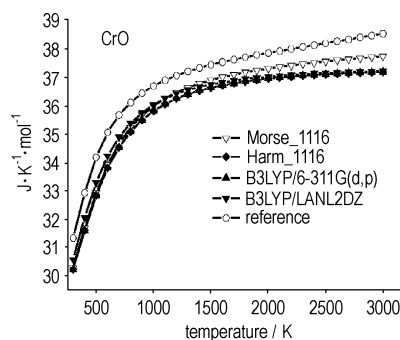
1D TNT slab detonation and 3D TNT shaped charge were simulated using a new modified SPH method with fully variable smoothing length.

Thermodynamics Calculations of Diatomic Molecules Based on Morse Potential

XU Yang-sen, LU Zhuan, WANG Ming-liang,

TIAN De-yu, LIU Jian-hong

Chinese Journal of Energetic Materials, 2009, 17(1): 32–35

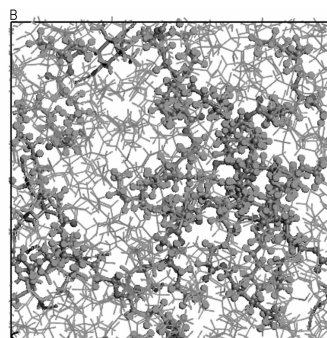


By using a new method based on Morse potential, the thermodynamic properties of many metal-containing (Cu, Fe, Pb, Cr, Sn, Ge) diatomic molecules were calculated at temperature from 300 K to 5000 K.

Molecular Dynamics Simulation of Plasticizer Diffusion

LI Hong-xia, QIANG Hong-fu,
WANG Guang, WU Wen-ming

Chinese Journal of Energetic Materials, 2009, 17(1): 36–41

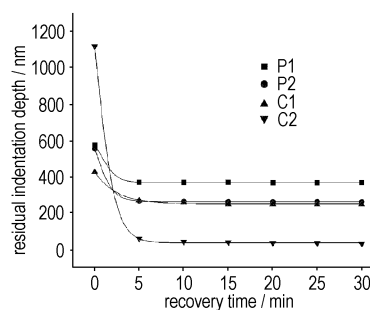


Plasticizer diffusion in the bond system of HTPB propellant was simulated by molecular dynamics method under the conditions of different temperatures and different contents.

Surface Deformation and Elasticity Recovery of PBXs and Coats

WEN Mao-ping, LAN Lin-gang, TIAN Yong, PANG Hai-yan

Chinese Journal of Energetic Materials, 2009, 17(1): 42–45

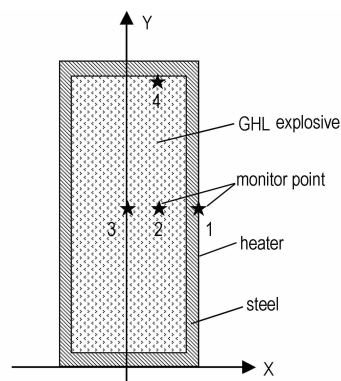


The mechanical properties of two PBXs (P1, P2) and two coats (C1, C2) were measured by nanoindentation technology. The sequence of their elasticity recovery were $P1 < P2 < C1 < C2$ and their residual depth changing with recovery time were fitted to Boltzmann non-linear function.

Numerical Simulation of Cook-off for Explosive at Different Heating Rates

WANG Pei, CHEN Lang, FENG Chang-gen

Chinese Journal of Energetic Materials, 2009, 17(1): 46–49



A thermal reaction model of explosive was established. The numerical simulation was used to model the cook-off process for GHL explosive at different heating rates by CFD software.

Reaction Rule for Explosive under Different Shape Warhead Impact in Steven Test



DAI Xiao-gan, SHEN Chun-ying,
WEN Yu-shi, XIANG Yong

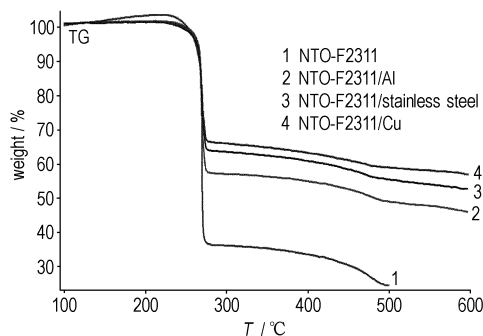
Chinese Journal of Energetic Materials, 2009, 17(1): 50–54

Steven test for PBX-2 explosive was made by using different shape warhead steel projectiles of 2.0 kg. PVDF pressure gauges were added for pressure measurement. Reaction characteristics for explosive were analyzed under different shape warhead impacts in Steven test.

Thermal Behaviors of NTO-Based PBXs and their Compatibilities with Metals

ZUO Yu-fen, NIE Fu-de, YU Wei-fei,
TIAN Xin, ZOU Jian-hua, LIU Shi-jun

Chinese Journal of Energetic Materials, 2009, 17(1): 55–58



The thermal behaviors of NTO based PBXs and their compatibilities with three metals were investigated using TG-DSC and vacuum stability test (VST).

Study on Turning Surface Micro-morphology and Roughness of PBX Parts

TANG Wei, LI Ming, HUANG Jiao-hu, ZHAO Yong-zhong,
ZHANG Qiu, YIN Rui, ZHAO Xiao-dong

Chinese Journal of Energetic Materials, 2009, 17(1): 59–63

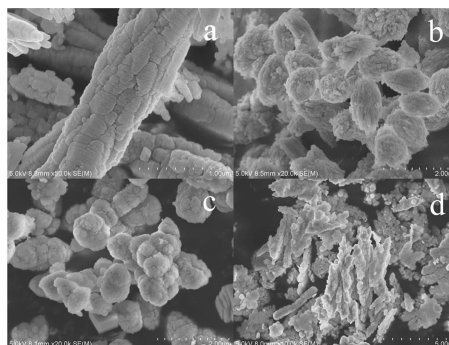
$$H_s = \frac{H_a}{k_y k_x k_n k_f k_z}$$

Surface roughness is considered as one important index of turning surface quality of a PBX component. This empirical formula was deduced based on experiments and theoretical height analysis of residual areas, which could forecast practical surface roughness under different cutting parameters.

Preparation of Ultrafine Calcium Carbonate with Different Shapes and Their Applications in the HTPB Propellant

LI Xiao-dong, YANG Rong-jie, YANG Yan

Chinese Journal of Energetic Materials, 2009, 17(1): 64–68

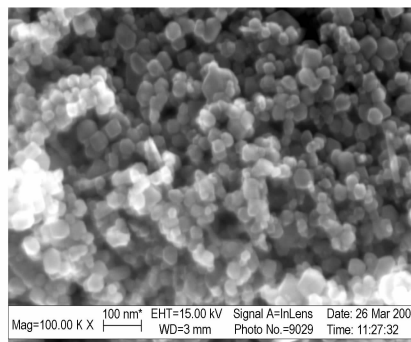


Ultrafine calcium carbonate particles were prepared by micro-latex method. Its shapes include clava, spindle, ellipsoid, bamboo-like, sphere, arborization, coral-like, conglutinate, cube and flake. Ultrafine calcium carbonate particle was determined by means of X-ray diffraction (XRD) and scan electron microscopy (SEM).

Effects of Nano-carbonate Catalyst on the Properties of AP/Al/HTPB Propellants

CAO Xin-fu, HE Yao-dong, YANG Yi, LI Feng-sheng, ZHANG Zhan-quan, SONG Ji-ge

Chinese Journal of Energetic Materials, 2009, 17(1): 69–72



A nanometer carbonate catalyst was prepared, and the effects of the catalyst on the pressure exponent, explosive heat and mechanical properties of the AP/Al/HTPB propellants were investigated.

Calculation and Analysis on Energy Characteristics of Composite BAMO-THF Propellants

ZHAI Jin-xian, YANG Rong-jie, ZHU Li-xun, LI Jian-min

Chinese Journal of Energetic Materials, 2009, 17(1): 73–78

The effects of AP, RDX, Al and ADN used as solid fillers, and A3(bis(2,2-dinitropropyl) acetal/bis(2,2-dinitropropyl) formal), NG/DEGDN used as plasticizers on energy characteristics of composite PBT propellants were investigated using least free energy method.

Energy Characteristics Computation of Propellant Containing 3,3'-Dinitro-4,4'-oxazafurazan

WANG Xu-peng, LUO Yun-jun, GUO Kai, Lü Yong

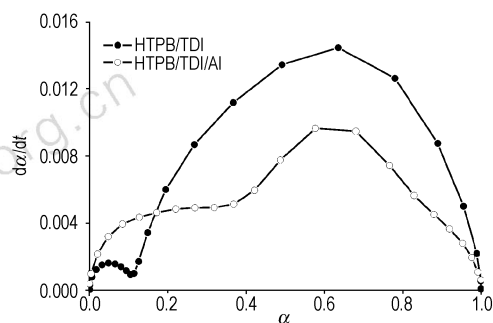
Chinese Journal of Energetic Materials, 2009, 17(1): 79–82

The energy parameters of the propellants containing 3,3'-dinitro-4,4'-oxazafurazan (DNOAF) were calculated under standard condition ($p_c/p_o = 70 : 1$).

Curing Kinetics of HTPB/TDI/Al System by Non-isothermal DSC

LIU Jing-ru, LUO Yun-jun

Chinese Journal of Energetic Materials, 2009, 17(1): 83–86



The curing reaction of HTPB/TDI can be accelerated by aluminum powder for the initial 18% of reaction extent and aluminum powder slows down the curing reaction for the latter 82% of reaction extent.

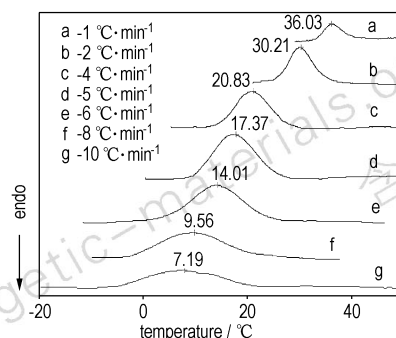
Numerical Simulation of Stress Distribution and Analysis of Damage Trend of NEPE Propellants

CHEN Yu, LIU Yun-fei, XIA Ji-dong, TAN Hui-min

Chinese Journal of Energetic Materials, 2009, 17(1): 87–90

The finite-element model for the NEPE solid propellant was established by the ANSYS 10.0 finite-element calculation software. The effects of the composition and structure properties of the NEPE propellants on the failure trend during the process of unilateral tensile were simulated.

Non-isothermal Crystallization Behaviors of PBAMO

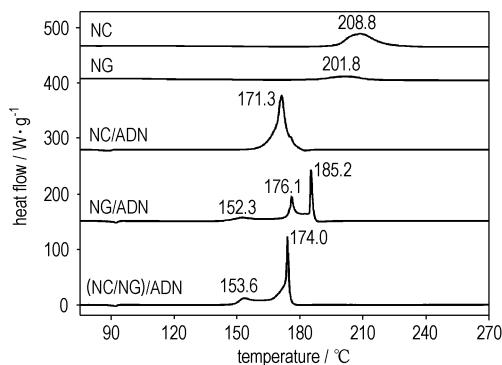


The non-isothermal crystallization behaviors of PBAMO were studied during cooling with different constant cooling rates by DSC. The results were analyzed by using Ozawa model and the crystallization activation energy was calculated from Kissinger equation.

GUO Kai, LUO Yun-jun

Chinese Journal of Energetic Materials, 2009, 17(1): 91–94

Interaction of NG/NC with ADN



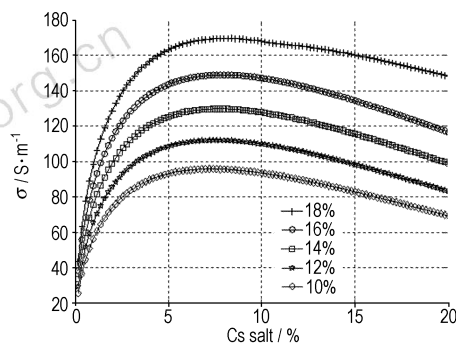
The interactions of double-base component (NC/NG) with ADN were investigated by PDSC, TG-DTG and VST.

ZHANG La-ying, HENG Shu-yun, LIU Zi-ru,

ZHANG Gao, ZHAO Feng-qi, TAN Hui-min

Chinese Journal of Energetic Materials, 2009, 17(1): 95–98

Electrical Conductivity of Combustion Products of Composite Propellant Containing Cs Salt

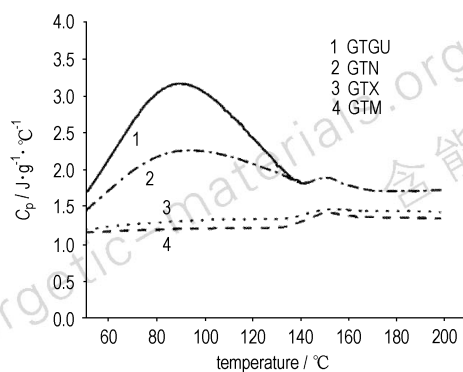


The change rules of electrical conductivity of combustion production of composite propellant containing Cs salt which used in Magneto-hydro-Dynamic (MHD) generator were studied. The relationship between electrical conductivity and Cs salt content was obtained by theoretical calculation.

ZHOU Lin, XIE Zhong-yuan, SHAO Qing-xin

Chinese Journal of Energetic Materials, 2009, 17(1): 99–102

Specific Heat Capacities of Carbohydrazide Perchloric Acid Coordination Compounds



QIAO Xiao-jing, HAO Zhi-jian, FAN Fan, SUN Cui-na
Chinese Journal of Energetic Materials, 2009, 17(1): 103 – 106

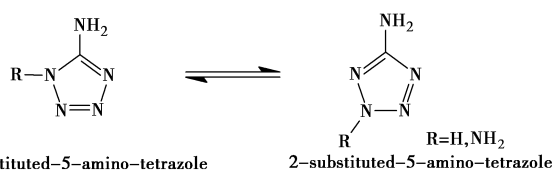
The specific heat capacity of carbohydrazide perchloric acid energetic coordination compounds was studied by differential scanning calorimetry (DSC).

Pervaporation and its Applications in Dehydration of Hydrazine Fuels

LI Zheng-li, ZHANG You-zhi, WANG Xuan-jun,
 LI Hong-bin
Chinese Journal of Energetic Materials, 2009, 17(1): 107 – 112

The development of dehydration of hydrazine fuels by pervaporation (PV) was reviewed.

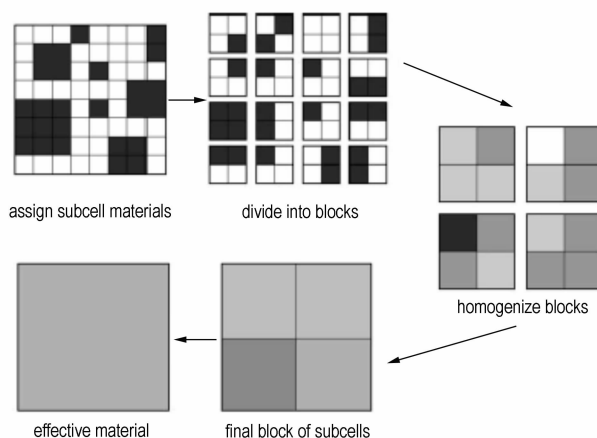
Progress in the Tautomerism and Decomposition of Amino-tetrazoles



FENG Li-na, ZHANG Jian-guo, ZHANG Tong-lai,
 SHU Yuan-jie, YANG Li, ZHENG Hui-hui
Chinese Journal of Energetic Materials, 2009, 17(1): 113 – 118

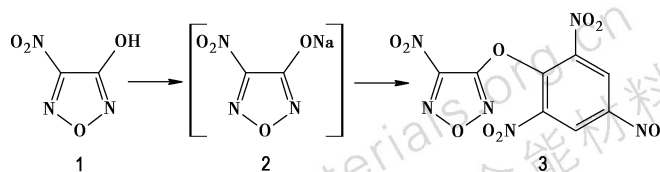
The tautomerization and decomposition channels of amino-tetrazoles, mainly 5-amino-tetrazole and 1,5-diamino-tetrazole were reviewed.

Progress in Predicting the Effective Elastic Properties of PBX



JING Shi-ming, LI Ming, LONG Xin-ping
Chinese Journal of Energetic Materials, 2009, 17(1): 119 – 123

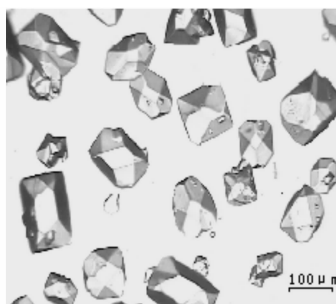
Some micromechanical-based methods for the determination of mechanical properties of PBX were introduced, and the advantage/disadvantage and the prospects of these methods were reviewed briefly.

Synthesis of Unsymmetrical Nitrofurazanyl Picryl Ether

An unsymmetrical nitrofurazanyl polynitrobenzene ether was synthesized via Williamson reaction and the structure was confirmed by NMR, FTIR and elemental analysis. Some properties of the compound, such as density, heat of formation, oxygen balance, detonation velocities and detonation pressures were calculated.

QIU Shao-jun, GE Zhong-xue, JIANG Jun, WANG Xi-jie,
LIAN Peng, GAN Xiao-xian

Chinese Journal of Energetic Materials, 2009, 17(1): 124

Preparation and Properties of Reduced-Sensitivity CL-20

Reduced-sensitivity CL-20 were prepared by special crystallization technique. Impact sensitivity and crystal properties including particle sizes and distribution, particle shape and internal porosity were compared between normal CL-20 and reduced-sensitivity CL-20. The results show that reduced-sensitivity CL-20 has better crystal quality and lower impact sensitivity.

LI Hong-zhen, XU Rong, HUANG Ming,

NIE Fu-de, ZHOU Jian-hua

Chinese Journal of Energetic Materials, 2009, 17(1): 125

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❁ 读者·作者·编者 ❁
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《含能材料》编辑部开通远程稿件处理系统

本刊自2009年1月起正式开通远程稿件处理系统,欢迎大家登陆本刊网站(www.energetic-materials.org.cn)进行在线投稿,今后本刊将不再接受纸版打印稿和E-mail电子版投稿。对于2008年尚未发表的稿件本刊将继续采用电子邮件的方式与作者联系。

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