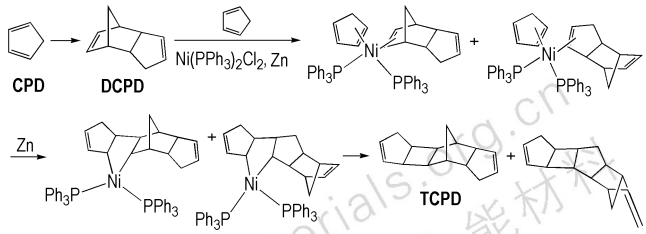
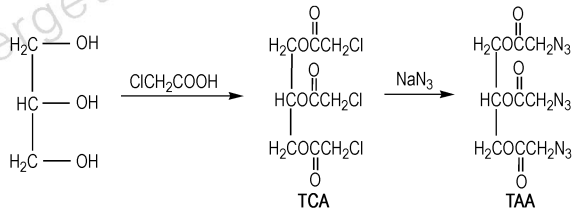
Synthesis of High Density Fuel Tricyclopentadiene by Oligomerization



LI Chun-ying, HE Fei, XU Qiang, Lü jian
Chinese Journal of Energetic Materials, **2014**, **22**(**6**): **728–731**

Tricyclopentadiene was synthesized through oligomerization of dicyclopentadiene and clopentadiene catalyzed by $Ni(PPh_3)_2Cl_2$ and zinc.

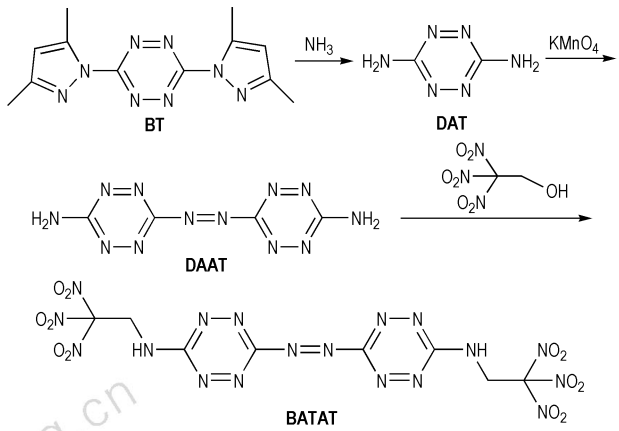
Synthesis and Characterization of Triazidotriacetin



LIU Ya-jing, MO Hong-chang, DING Feng, ZHANG Li-jie, GAO Fu-lei, JI Yue-ping
Chinese Journal of Energetic Materials, **2014**, **22**(**6**): **732–735**

A new compound triazidotriacetin (TAA) was synthesized and characterized by IR, NMR and elemental analysis. TAA is a yellow oily liquid with decomposition temperature of 247.4 ℃ and glass transition temperature of less than −70 ℃.

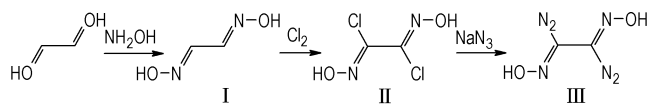
Synthesis and Characterization of Trinitroethyl Compounds Derived from Tetrazine



GUAN Ming-yu, YANG Hong-wei, Lü Chun-xu, CHENG Guang-bin
Chinese Journal of Energetic Materials, **2014**, **22**(**6**): **736–740**

3,6-Diamino-1,2,4,5-tetrazine(DAT) was synthesized by nucleophilic substitution using 3,6-bis(3,5-dimethylpyrazol)-1,2,4,5-tetrazine (BT) as the precursor. Then the 3,3′-azobis(6-amino-1,2,4,5-tetrazine) (DAAT) was obtained from oxidative coupling reaction of DAT, and the energetic compound 3,3′-diazenebis(*N*-(2,2,2-trinitroethyl)-1,2,4,5-tetrazin-6-amino) (BATAT) was first synthesized from 2,2,2-trinitroethanol and DAAT.

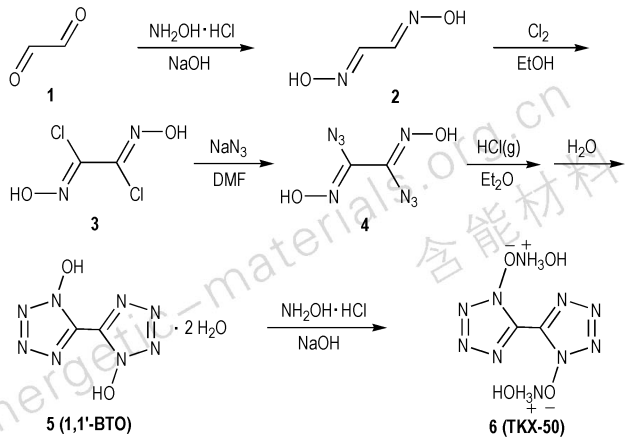
Synthesis and Characterization of Diazidoglyoxime



WANG Xiao-jun, SU Qiang, ZHANG Guang-yuan, WANG Xia, WANG Jun-feng
Chinese Journal of Energetic Materials, **2014**, **22**(**6**): **741–743**

Diazidoglyoxime(DAG, Ⅲ) was synthesized from solution glyoxal (40% *w*/*w* in H_2O) and hydroxylammonium. The structure of title compound was characterized by IR, elemental analysis and ^1H NMR, and the properties were also discussed.

Up-sizing 50 Grams-scale Synthesis Technology of Dihydroxylammonium 5,5′-Bistetrazole-1,1′-Diolate (TKX-50)

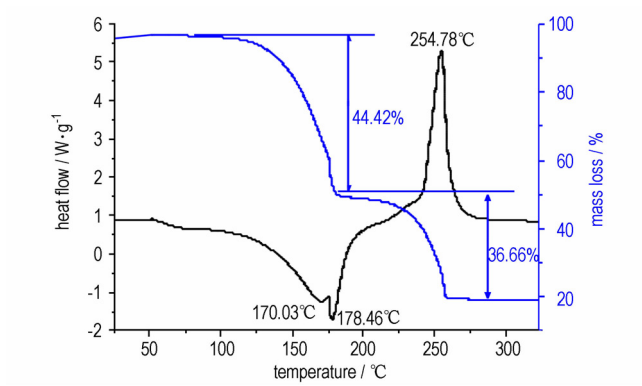


ZHAO Ting-xing, TIAN Jun-jun, LI Lei, FAN Gui-juan, ZHANG Guang-quan, LI Hong-bo, HUANG Ming

Chinese Journal of Energetic Materials, 2014, 22(6): 744–747

5,5′-Bistetrazole-1,1′-diol dihydrate (1,1′-BTO) was synthesized. Dihydroxylammonium 5,5′-bistetrazole-1,1′-diolate (TKX-50) was successfully obtained from the reaction of 1,1′-BTO with hydroxylamine aqueous solution in 50 grams scale.

Spectroscopic Properties of Metaldehyde and Copper Nitrate-ammonia Mixture

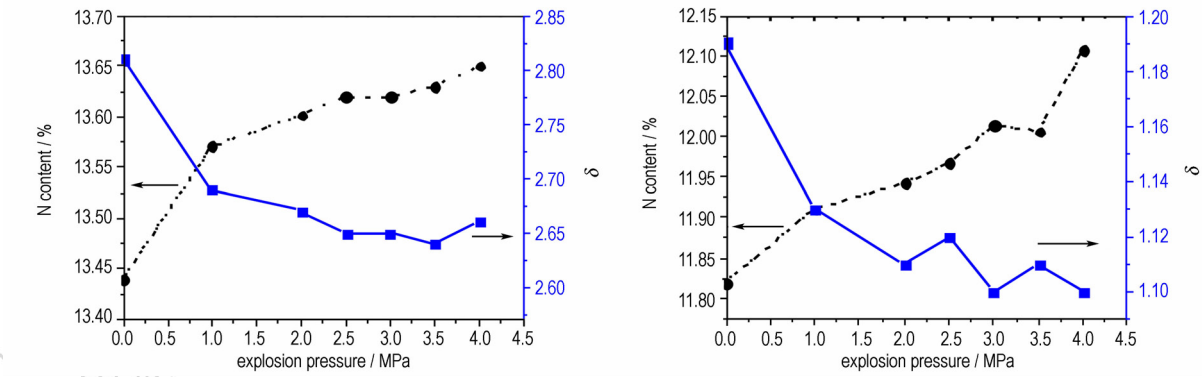


BA Shu-hong, ZHOU Long, SUN Zhen-xing, WANG Gui-ping, CHENG Xiu-lian, DU Xue-feng

Chinese Journal of Energetic Materials, 2014, 22(6): 748–751

Spectroscopic properties of metaldehyde and copper nitrate-ammonia mixture were studied by TG/DSC method and photoelectric detection technology.

Effect of Nitration Agents and Soft Wood Treatment on Nitrogen Content and Uniformity of Nitrocellulose

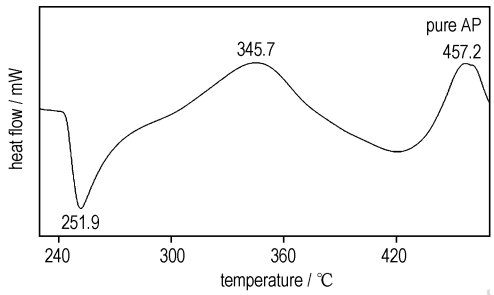


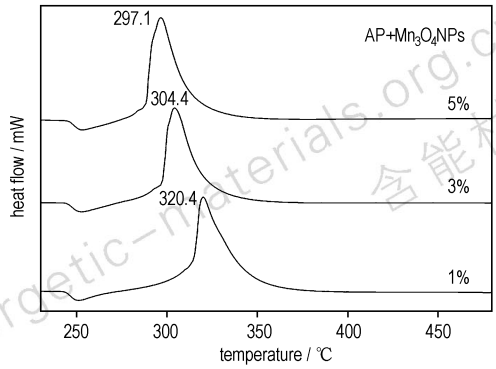
HAO Hong-ying, WANG Fei-jun, ZHANG Yun-hua, SHAO Zi-qiang, SUN Jun

Chinese Journal of Energetic Materials, 2014, 22(6): 752–757

Nitrocellulose with A, B, C and D grade were prepared by nitrating in $HNO_3/H_2SO_4/H_2O$ and HNO_3/CH_2Cl_2, respectively. Using high pressure steam explosion technology, soft wood was treated. The nitrogen content distribution of NC was discussed before and after steam explosion.

Preparation of Mn_3O_4 Microspheres and Their Catalytic Effects upon Thermal Decomposition of Ammonium Perchlorate

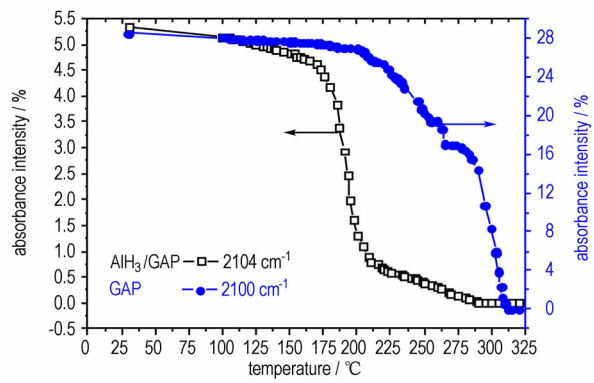


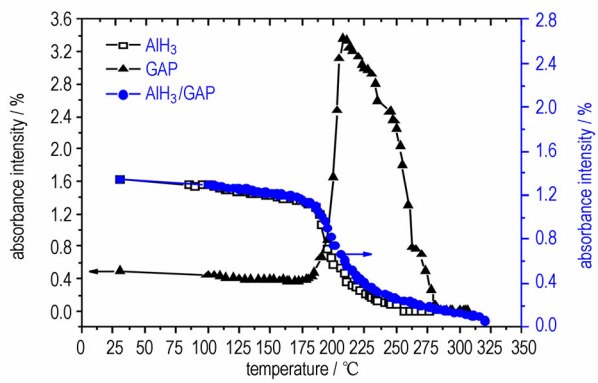


LI Lu-ming, LI Zhao-qian, MA Yong-jun, PEI Chong-hua
Chinese Journal of Energetic Materials **,2014,22(6): 758-761**

Mn_3O_4 microspheres were successfully prepared. The composition and morphology of Mn_3O_4 microspheres were characterized by XRD, FESEM and TEM. The effects of Mn_3O_4 microspheres on the thermal decomposition properties of AP were investigated by DSC.

Pyrolysis Characteristic of AlH_3/GAP System

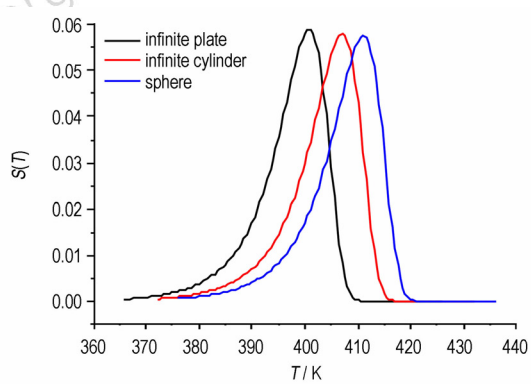




LI Lei, CHENG Xin-li, NIU Fei, LI Jun, ZHAO Xiao-bin
Chinese Journal of Energetic Materials **,2014,22(6): 762-766**

The thermal decompositions of AlH_3, GAP and AlH_3/GAP mixed system were studied by in-situ thermolysis-FTIR coupling techniques.

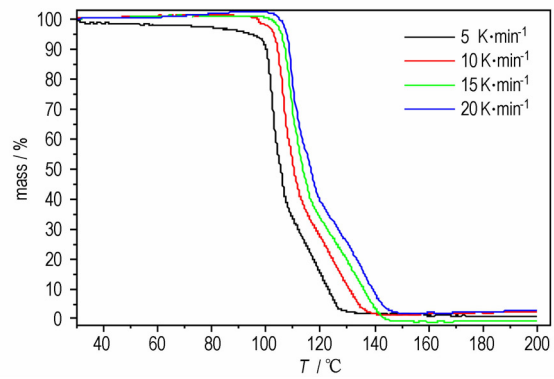
Non-isothermal Thermal Decomposition Kinetics and Thermal Safety of DNGTz



HU Yong-peng, ZHAO Xu-fang, ZHAO Ning-ning, YAN Biao, GAO Hong-xu, ZHAO Feng-qi, HU Rong-zu, SONG Ji-rong, MA Hai-xia
Chinese Journal of Energetic Materials **,2014,22(6): 767-773**

The compound 3,6-bis-nitroguanyl-1,2,4,5-tetrazin (DNGTz) was synthesized and its thermal behavior was studied by differential scanning calorimetry (DSC) and thermogravity (TG-DTG). The data in DSC curve were used to analyze the thermal decomposition mechanism and kinetics using the methods of Kissinger, Ozawa and integral.

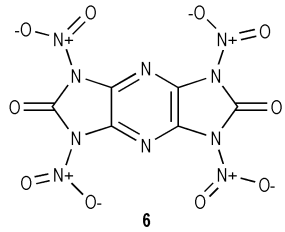
Thermal Decomposition Kinetics and Thermal Safety of HNF



Thermal decomposition characteristics and kinetic behaviors of HNF were studied by vacuum stability test(VST), differential scanning calorimetry (DSC) and thermogravimetry (TG). The kinetic equations describing the two exothermic decomposition reaction processes of HNF were presented.

SUN Xiao, WANG Juan, ZHOU Xin-li
Chinese Journal of Energetic Materials,2014,22(6): 774-779

Quantum Chemical Studies on the Structures and Properties of Nitro Derivatives of Symmetric Pyrazino-dicycloureas

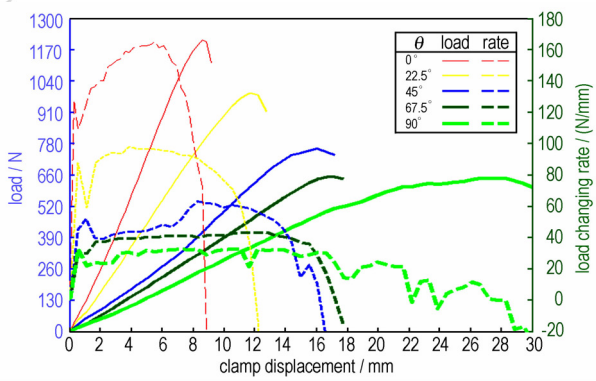


6

The molecular geometries and electronic structures of nitro derivatives of symmetric pyrazino-dicycloureas were obtained at the B3LYP/6-31G** level. Their theoretical molecular density (ρ) and heat of formation (HOF) were computed by quantum chemical method and detonation velocity (D) and detonation pressure (p) were estimated using Kamlet-Jacobs equations.

MA Cong-ming, LIU Zu-liang, YAO Qi-zheng
Chinese Journal of Energetic Materials,2014,22(6): 780-785

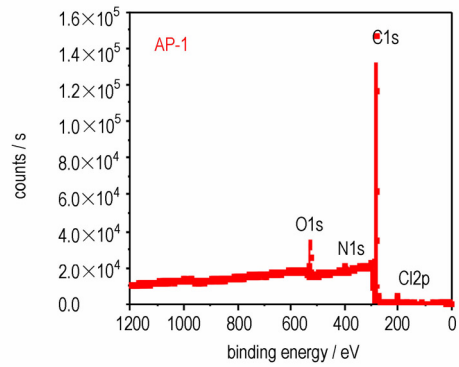
Multi-angle Tensile Test for Solid Propellant Rectangular Adhesive Specimens



A multi-angle tensile clamp was designed for rectangular adhesive specimen according to QJ 2038.1A-2004. Pure tensile, pure shear and tensile-shear mixed stress conditions on the specimen interface were realized.

QIU Xin, LI Gao-chun, JIANG Ai-min, ZHAO Da-peng
Chinese Journal of Energetic Materials,2014,22(6): 786-791

Desensitizing Technology of AP by Coating and its Application

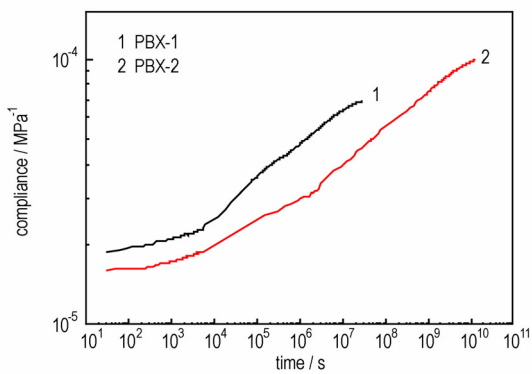


The desensitizing technology of ammonium perchlorate(AP) was studied by coated with wax or themoplastic polyurethane(TPU) as insensitive coating additive. The coupling relations between AP and explosive RDX were studied and the application of coated AP in typical cast PBX was investigated.

LI Yu-bin, HUANG Hui, PAN Li-ping, ZHANG Jian-hu, LI Jing-shan, ZHENG Bao-hui

Chinese Journal of Energetic Materials,2014,22(6): 792–797

Influence of F2311 Content on Creep Performance of TATB-based Polymer Bonded Explosive



Three-point bending creep behavior of TATB-based polymer bonded explosive (PBX) were investigated to explore the effects of fluoroelastomer (F2311) content on the creep properties.

LIN Cong-mei, LIU Jia-hui, LIU Shi-jun, TU Xiao-zhen, HUANG Zhong, LI Yu-bin, ZHANG Jian-hu

Chinese Journal of Energetic Materials,2014,22(6): 798–803

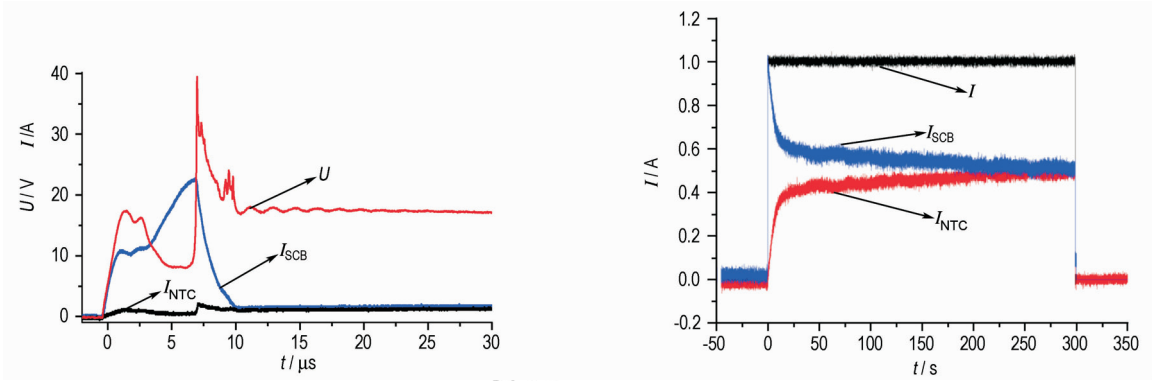
Charge Process of DNAN Based Melt Cast Explosive by Orthogonal Experiments

Influence of main process factors and important degree of various factors on average charge density, density difference and ingredient uniformity of the MX-2 (a typical 2,4-dimitroanisole(DNAN) based thermoplastic melt-cast explosive) were investigated by orthogonal experiments.

JIN Da-yong, WANG Hong-xing, NIU Guo-tao, WANG Qin-hui, WANG Shu-ping, HUANG Wen-bin, CAO Shao-ting, NIU Lei

Chinese Journal of Energetic Materials,2014,22(6): 804–807

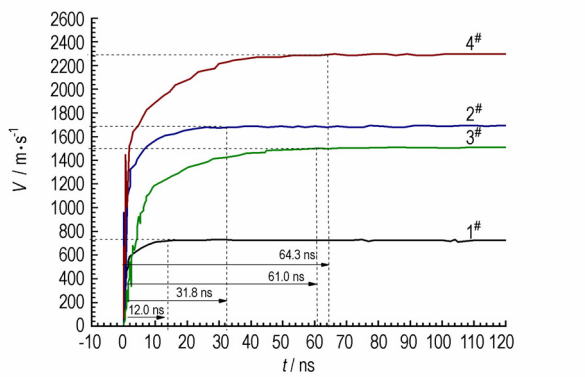
Influence of NTC Thermistors on Electro-explosive Performances of SCB



Constant current (1A) was forced to flow through igniters for 5 min at 25 ℃ and 70 ℃ to analyze the influence of NTC thermistors on SCB electro-explosive performances. With capacitor discharge experiment, the electro-explosive performances of the SCB initiators in parallel with NTC thermistors were discussed.

LI Yong, LI Kai, LIU En-liang, ZHOU Bin
Chinese Journal of Energetic Materials **,2014,22(6): 808–812**

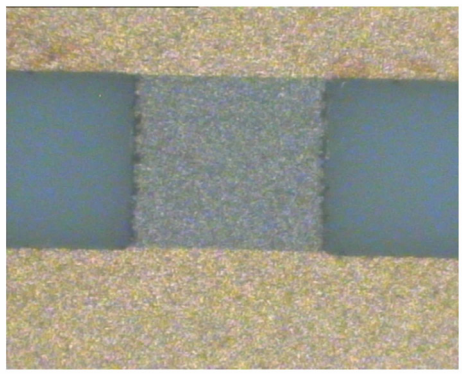
Structure Optimization and Velocity Measurement of Flyer in Laser Slapper Detonator



The C/Al/Al_2O_3/Al multi-flyers were prepared with the magnetron sputtering, and the performances of flyers were studied by SEM. Taking advantage of photonic dopper velocimetry (PDV), accelerating processes of flyers with different parameters were analyzed. The influence of each material used in multi-flyers were discussed.

WANG Meng, QIN Wen-zhi, FU Qiu-bo, HE Bi, JIANG Ming
Chinese Journal of Energetic Materials **,2014,22(6): 813–818**

Preparation and Characterization of Insensitive Ni-Cr Metal Film Igniting Component



By using the magnetron sputtering technology, a metal film bridge which fits for the insensitive electric initiating explosive device (EED) was made.

WANG Ke-wei, YANG Zheng-cai, LIU Hai-xu,
ZENG Xiang-tao, WANG Hao-jing, LI Ning,
PAN Shou-hua, CAO Jian-qiang, ZHOU Dang-feng
Chinese Journal of Energetic Materials **,2014,22(6): 819–823**

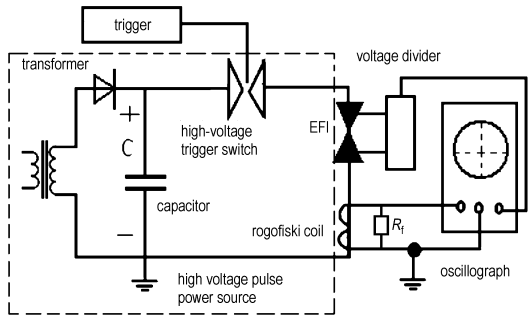
Firing Model of Ni-Cr Bridge-belt Electric Initiating Devices under Current Input

Based on the non-Fourier heat conduction theory, the electro-thermal energy conversion model was established for the stage from heating to firing, then the correlation of bridge-belt and input energy was obtained by MATLAB analysis.

ZHOU Qing, JIAO Qing-jie

Chinese Journal of Energetic Materials,2014,22(6): 824-827

Effect of High Voltage Pulse Power Source Equivalent Parameter on Exploding Performance of Foil Bridge

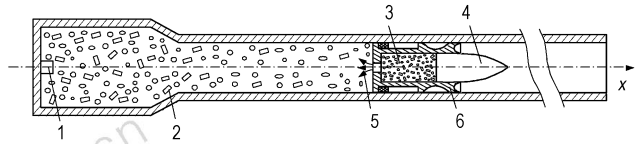


The effects of the high voltage pulse power source equivalent parameter on the exploding performance of the foil bridge were investigated with 0.5mm×0.5mm×5.0μm copper foil bridge. By calculating the performance parameter including the equivalent inductance, equivalent resistance, etc. the energy output efficiency was obtained, and the change rules were studied.

HAN Ke-hua, ZHOU Jun, REC Xi, LIU Tian, AO Cheng-gang, TONG Hong-hai

Chinese Journal of Energetic Materials,2014,22(6): 828-833

A New Firing Charge Concept of Increasing Intelligent Ammunition Muzzle Velocity

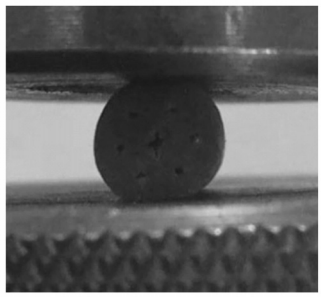


A new firing concept based on differential traveling charge technology can largely increase gun launched intelligent ammunition muzzle velocity, and improve gun working volume utilization rate.

ZOU Hua, LU Xin, ZHOU Yan-huang, ZHAO Run-xiang

Chinese Journal of Energetic Materials,2014,22(6): 834-839

Mechanical Analysis of Granular Propellant by Brazilian Test

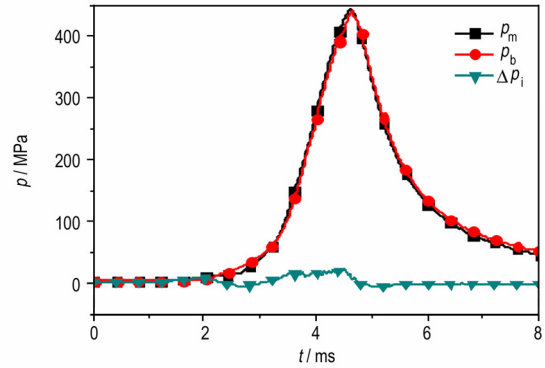


The mechanical performance of granular propellant was studied by brazilian test taking the loading features into account. Theories of Hertz elastic contact and elastic mechanics plane stress were applied to analyze the stress distribution law, and the formula was obtained to calculate tensile strength for propellant from Griffith strength criteria.

CHEN Yan-kun, LUO Xing-bai, LIU Guo-qing, ZHEN Jian-wei, ZHANG Yan-ming

Chinese Journal of Energetic Materials,2014,22(6): 840-844

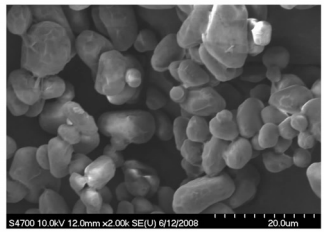
Ignition Performance of Grain-molded Gun Propellant Charge



Grain-moled gun propellant was prepared based on nitramine propellant by surface-detering, surface-coating, and grain-molding. Two ignition schemes were designed. The first was bottom configuration, and the second was central core igniter.

JIAO Xu-ying, DU Jiang-yuan, ZHANG Yu-cheng, JIA Yong-jie
Chinese Journal of Energetic Materials **,2014,22(6): 845-847**

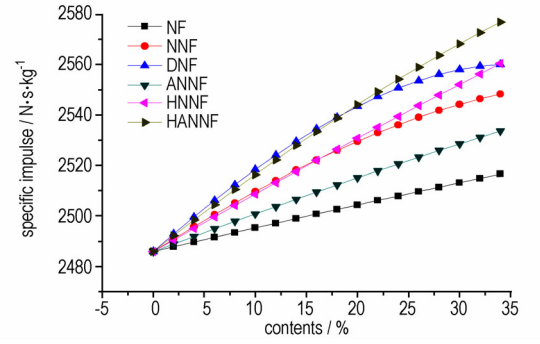
Preparation Improvement of Superfine A5 Booster Explosive



Superfine A5 booster explosive was prepared by the solvent evaporation technology. It is coated evenly, and its impact sensitivity reduces and its component can be controlled more exactly.

CHEN Ya-fang, LIU Yu-cun, WANG Bao-guo, KANG Jian-cheng, ZHAO Wen-hu
Chinese Journal of Energetic Materials **,2014,22(6): 848-851**

Energy Characteristics of CMDB Propellants with Nitrofurazan Compounds



The energy characteristics of six nitrofurazan compounds, 3-nitrofurazan (NF), 3,4-dinitrofurazan (DNF), 3-nitrimino-4-nitrofurazan (NNF), 3-nitramino-4-nitrofurazan ammonium salt(ANNF), 3-nitimino-4-nitrofurazan hydrazonium salt (HNNF) and 3-nitramino-4-nitrofurazan hydroxyl ammonium(HANNF), were studied by NASA- CEA software.

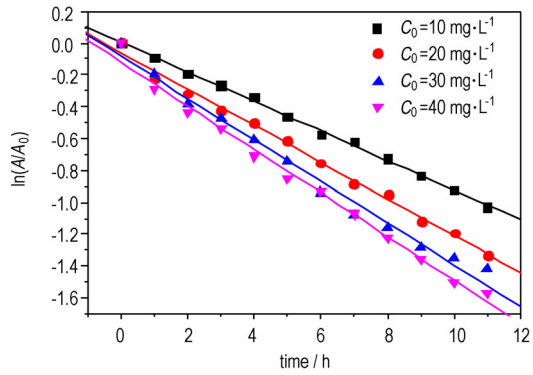
FU Xiao-long, FAN Xue-zhong, WANG Han, BI Fu-qiang, LI Ji-zhen, LI Hong-yan, LIU Xiao-gang
Chinese Journal of Energetic Materials **,2014,22(6): 852-856**

Experimental Study on High Power Class 3 Permissible Water Gel Explosive

A new explosive composition for improve blasting power was developed, and detected by the authority department.

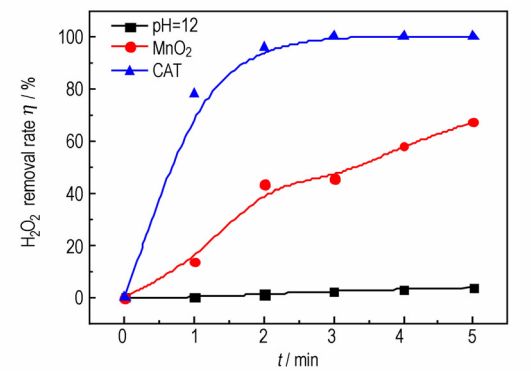
WANG Hai-bo, GUO Zi-ruo, ZONG Qi
Chinese Journal of Energetic Materials **,2014,22(6): 857-861**

Preparation of TiO_2/CNT Composite Particles and Application in the Photo-catalytic Degradation of TNT Wastewater



DU Shi-guo, YAN Jun, WANG Ming-qiu, WANG Bin
Chinese Journal of Energetic Materials,2014,22(6): 862–866

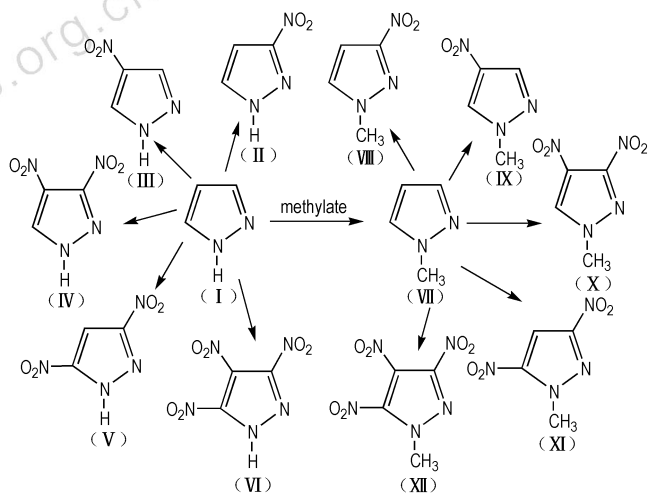
Interference of H_2O_2 on COD Test and Removal Method for Advanced Oxidation Process



GUO Liang, JIAO Wei-zhou, LIU You-zhi, XU Cheng-cheng, LIU Wen-li, LI Jing
Chinese Journal of Energetic Materials,2014,22(6): 867–871

The linear interference of H_2O_2 concentration on COD test was found by experiment. Without new interference, the approaches to the suppression of interference of H_2O_2 on COD test were discussed.

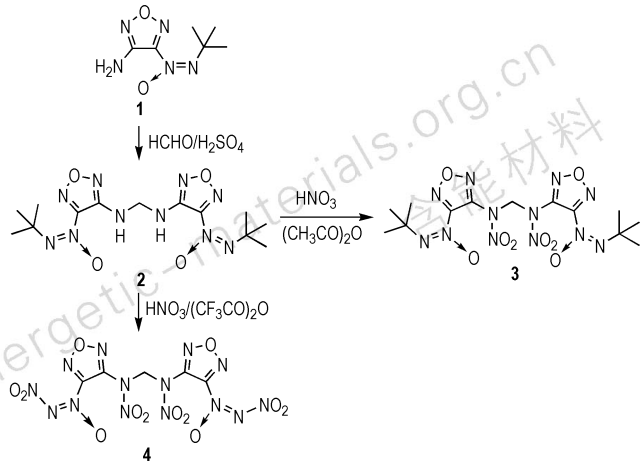
Review on Synthesis of Nitropyrazoles



GUO Jun-ling, CAO Duan-lin, WANG Jian-long, WANG Yan-hong, QIAO Rui, LI Yong-xiang
Chinese Journal of Energetic Materials,2014,22(6): 872–879

Synthesis of the 12 kinds of nitropyrazoles were summarized and compared in detail, and their development is prospected.

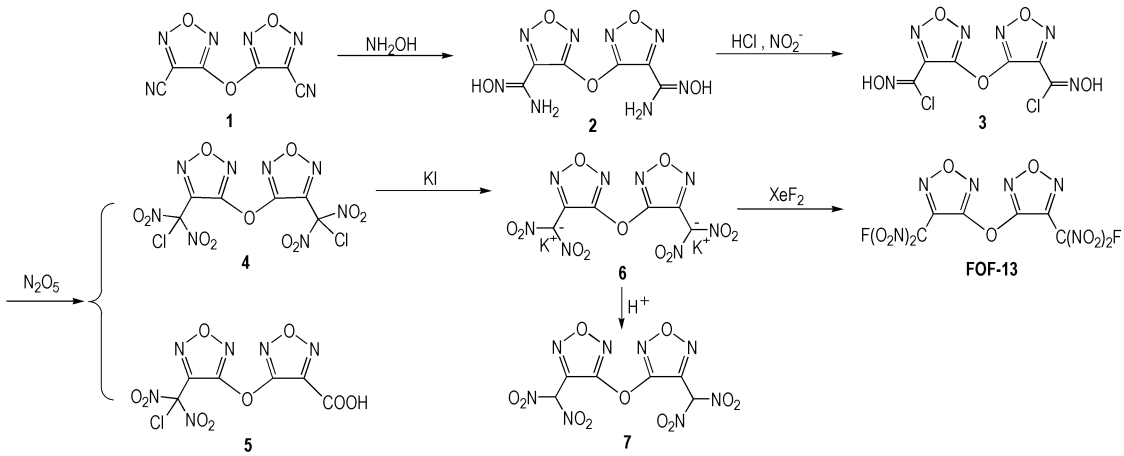
A Novel Energetic Material Based on Nitro-*NNO*-azoxy: Synthesis and Characterization



LI Hui, ZHAO Feng-qi, YU Qian-qian, LAI Wei-peng, WANG Bo-zhou

***Chinese Journal of Energetic Materials*,2014,22(6): 880–883**

A Novel Synthesis of 3,3'-Bis(fluorodinitromethyl) difurazanyl ether(FOF-13)



WANG Bo-zhou, ZHAI Lian-jie, LIAN Peng, LI Ya-nan, LI Hui, HUO Huan, LI Xiang-zhi

***Chinese Journal of Energetic Materials*,2014,22(6): 884–886**

An excellent energetic plasticizer FOF-13 was synthesized via a novel five-step reaction process, and its main energetic properties were determined.