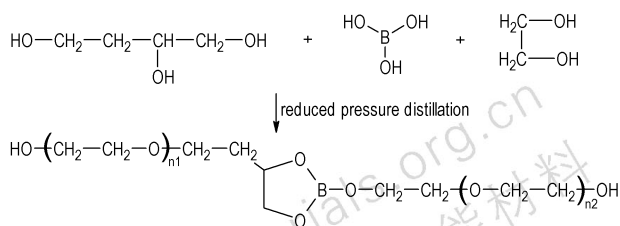


Synthesis and Hydrolysis Kinetics of a Five-membered Heterocyclic Borate Ester

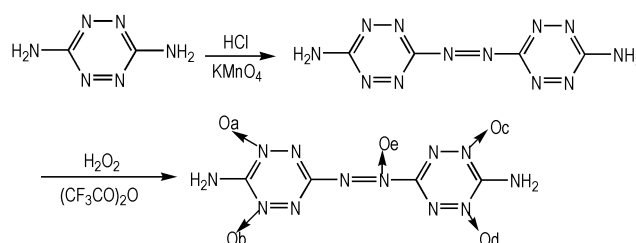


A borate ester bonding agent with a five-membered ring was synthesized via a "one-pot" process using borate acid, ethylene glycol and 1,2,4-butanetriol as raw materials. Its structure was characterized by FTIR, ^{11}B NMR, ^1H NMR and MS. The hydrolysis reaction kinetic model was established.

YU Hai-jiang, MA Jun, GAO Deng-pan, ZHENG Bao-hui, YANG Pan

Chinese Journal of Energetic Materials, 2014, 22(1): 1-6

Synthesis and Properties of Energetic Oxidizer *N*-oxides 3,3'-azo-bis(6-amino-1,2,4,5-tetrazine)

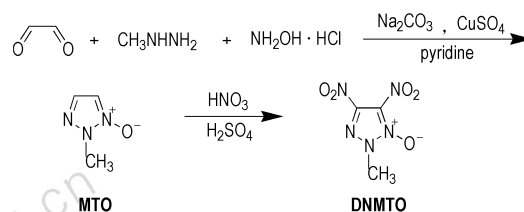


LUO Yi-fen, ZHOU Qun, WANG Bo-zhou, LI Hui, ZHOU Cheng, LI Ji-zhen, FAN Xue-zhong

Chinese Journal of Energetic Materials, 2014, 22(1): 7-11

Using 3,6-diamino-1,2,4,5-tetrazine as starting material, a high energetic oxidizer *N*-oxides of 3,3'-azo-bis(6-diamino-1,2,4,5-tetrazine) (DAATO_{3.5}) was synthesized and some properties were also measured.

Synthesis and Characterization of 2-Methyl-4,5-dinitro-1,2,3-triazole-1-oxide

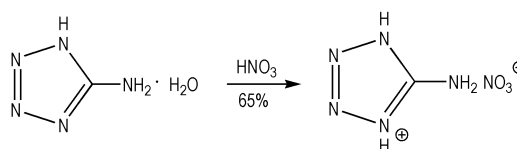


YANG Wei, YU TAO, WANG Xiao-feng, WANG Bo-zhou, LI Ya-nan, WANG You-bing

Chinese Journal of Energetic Materials, 2014, 22(1): 12-16

With glyoxal, methylhydrazine and hydroxylamine hydrochloride as starting materials, 2-methyl-4,5-dinitro-1,2,3-triazole-1-oxide (DNMTO) was synthesized by the process of condensation, oxime, cyclization and nitration and title compound and its intermediate were characterized by IR, ^1H NMR and elemental analysis.

Optimization of Synthesis Process and Structural Characterization of 5-ATN



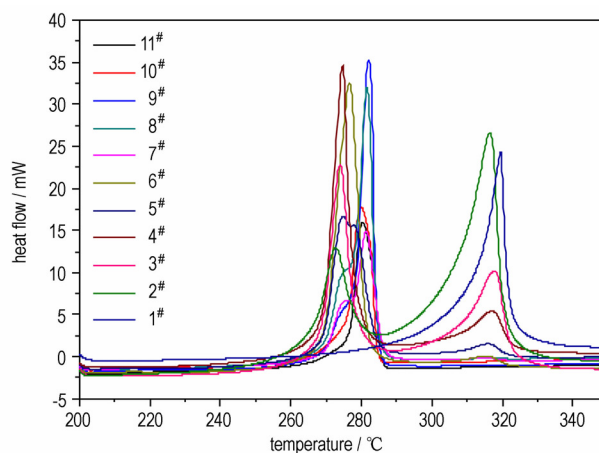
WANG Meng-meng, DU Zhi-ming, ZHAO Zhi-hua, HAN Zhi-yue

Chinese Journal of Energetic Materials, 2014, 22(1): 17-21

5-Aminotetrazolium nitrate was synthesized from 5-aminotetrazole monohydrate (5-AT·H₂O) and concentrated nitric acid. The effects of nitric acid dosage, reaction time and reaction temperature on the yield of 5-ATN were studied by orthogonal experiment.

Effects of Novel Energetic Material NOG_2Tz on Thermal Decomposition Behavior of HMX

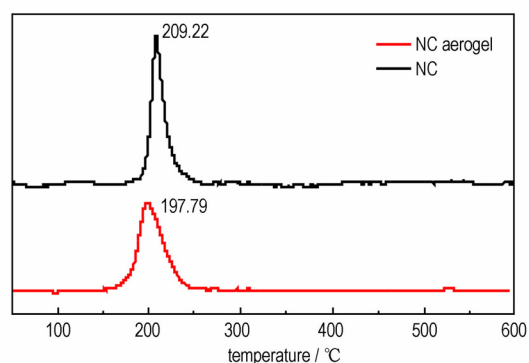
WANG Yang, QIU Rui, WANG Qi, WANG En-yu, ZHAO Lin-man, WANG Peng, CHEN Fu-xue, HUANG Jing-lun
Chinese Journal of Energetic Materials, 2014, 22(1): 22–25



The decomposition temperatures of composite explosives (HMX + NOG_2Tz) in different mass proportions were measured by differential scanning calorimetry (DSC).

Microstructure and Thermal Behavior of NC Aerogel

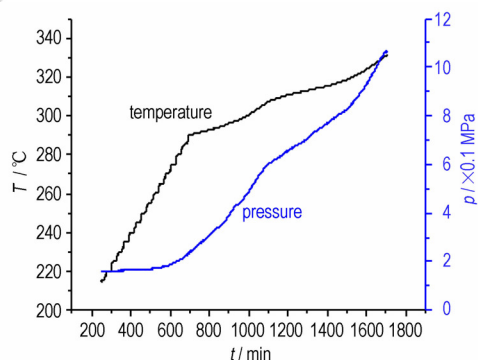
YU Xian-feng, JIN Miao-miao
Chinese Journal of Energetic Materials, 2014, 22(1): 26–30



Using sol-gel method and supercritical drying, NC aerogel with nanostructure was prepared, and characterized by SEM, XRD and TG/DSC-FTIR methods. The microstructure and thermal property of NC aerogel are quite different with NC.

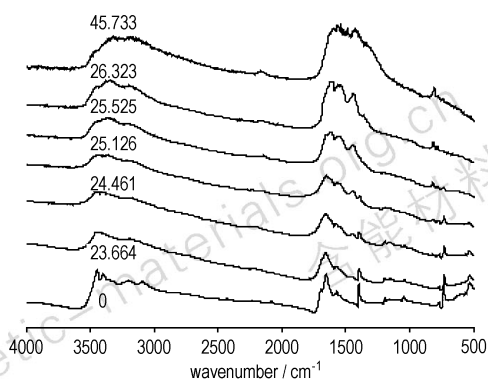
Adiabatic Decomposition Study on 2, 6-Diamino-3, 5-dinitropyridine-1-oxide by Accelerating Rate Calorimeter

HE Zhi-wei, YAN Shi-long, LIU Zu-liang
Chinese Journal of Energetic Materials, 2014, 22(1): 31–35



The adiabatic decomposition process of ANPyO was measured by an accelerating rate calorimeter. The decomposition temperature, pressure and temperature rise rate versus time curves, and pressure and temperature rise versus temperature curves were obtained. Apparent activation energy, pre-exponential factor and heat of reaction were calculated.

Mechanism of Thermal Decomposition of Guanidinium Azotetrazolate

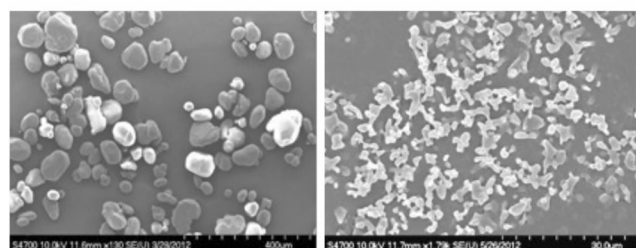


The thermal behavior of guanidinium azotetrazolate (GZT) was studied using the thermogravimetry and differential scanning calorimetry. The thermal decomposition mechanism of GZT was proposed based on the investigation of products in condensed and gas phases by the combination techniques of solid in situ cell with the rapid-scan Fourier transform infrared spectroscopy and pyrolysis-gas-chromatography-mass-spectrometry (Py-GC-MS).

WANG Qiong, AN Ting, PAN Qing, NING Yan-li,
FAN Xue-zhong, ZHAO Feng-qi

Chinese Journal of Energetic Materials, 2014, 22(1): 36–42

Preparation of Ultrafine RDX by Solution Enhanced Dispersion Technique of Supercritical Fluids

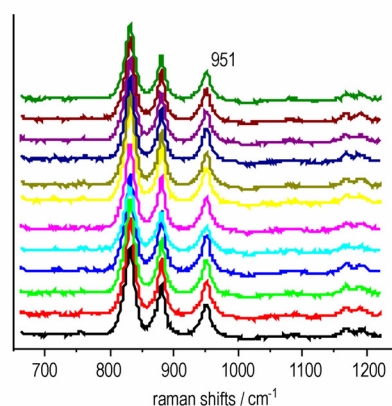


SHANG Fei-fei, ZHANG Jing-lin, WANG Jin-ying,
ZHANG Xiao-lian

Chinese Journal of Energetic Materials, 2014, 22(1): 43–48

The crystallization refinement of RDX was performed by the process solution enhanced dispersion technique of supercritical fluids (SEDS method).

Quality Evaluation of HMX Crystals by Micro-raman Spectroscopy



The relationship between characteristic parameters of micro-raman spectra and quality of different HMX crystals including single crystal, spherical crystal and industrial crystal was studied. Based on the comparison of peaks of micro-raman spectra, the characteristic peak of HMX crystal was determined.

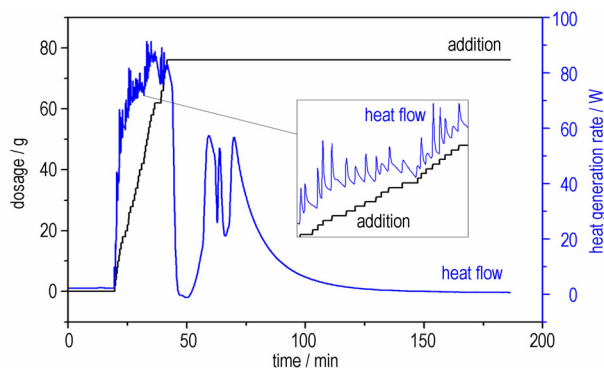
LUAN Jie-yu, CHEN Zhi-qun, WANG Ming, XU Min,
WANG Ke-yong

Chinese Journal of Energetic Materials, 2014, 22(1): 49–52

Thermal Hazards of Nitration Reaction in the Synthesis of FOX-7

ZHOU Cheng, ZHU Yong, WANG Bo-zhou, LU Hong-lin, ZHOU Yan-shui

Chinese Journal of Energetic Materials, 2014, 22(1): 53–56

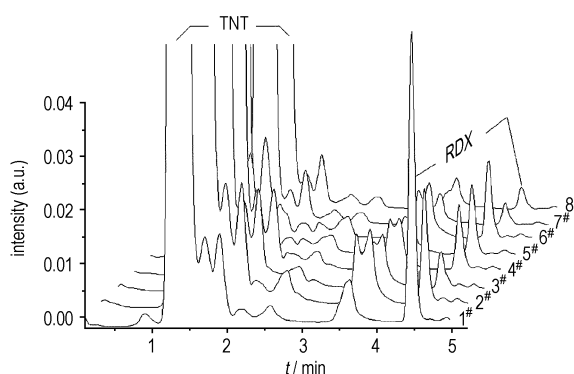


The thermodynamic data of heat flow curve, heat transfer coefficient and heat capacity in nitration reaction of 2-methylpyrimidine-4,6-dione in the synthesis of FOX-7 were measured by using reaction calorimeter (RC1e). The thermal behaviors of intermediate 2-dinitromethylene-5,5-dinitropyrimidine-4,6-dione were analyzed.

Characterization of the Coverage of Polymer-coated RDX

ZHANG Shuai, HUANG Hui, LUO Guan, ZHAO Tian-bo, WANG Jia, DING Hong-jing, JIANG Wei

Chinese Journal of Energetic Materials, 2014, 22(1): 57–61

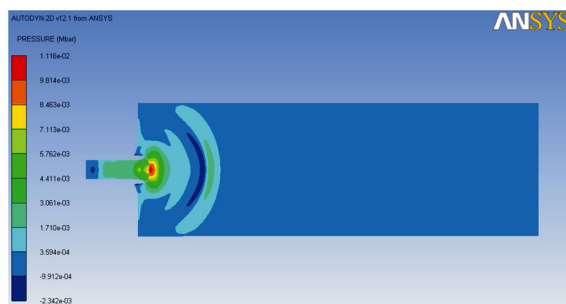


Coated RDX were prepared by water suspension coating method, spray coating method and demulsification method, using acrylonitrile-styrene (AS) copolymer, fluoro rubber (F2311), polyurethane elastomer (Estane5701) and waterborne polyurethane (WPU) as coating raw materials, respectively. The high performance liquid chromatography (HPLC) determination of coated particles, quantitative determination of the dissolution quantity of RDX and calculation of the adhesive coated degree of RDX were carried out.

Vulnerability of Composition B by Bullet Penetration

XI Peng, NAN Hai, NI Bing, YANG Jian-gang, JIA Xian-zhen, ZHENG Ya-feng

Chinese Journal of Energetic Materials, 2014, 22(1): 62–65

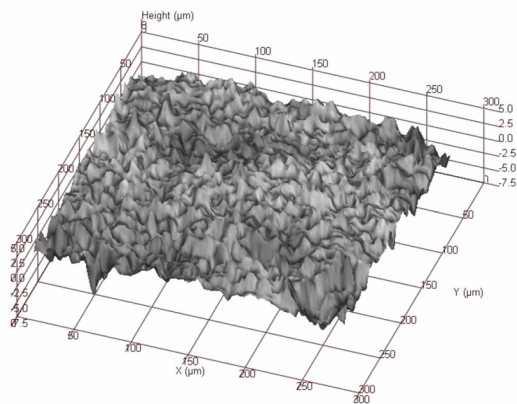


The effects of the penetration depth and ambient temperature on the response of Comp. B explosive were evaluated by bullet penetration experiment. The processes of bullet penetration were simulated by the non-linear finite element software ANSYS/LS-DYNA.

Effect of Ultrasonic Vibration on Cutting Surface Quality of Explosive Simulants

WU Song, HUANG Jiao-hu, LIU Wei, TANG Shi-long,
TANG Xian-jin

Chinese Journal of Energetic Materials, 2014, 22(1): 66–70



The ultrasonic vibration turning mechanism of explosive simulants was studied and the effects of the common turning and the ultrasonic vibration turning mode with amplitude of 2, 3, 4, 5 μm on the machined surface quality were compared and analyzed.

Effect of Ultrasonic Vibration Cutting on Cutting Temperature of Explosive Simulants

TANG Wei, ZONG He-hou, WEI Zhi-yong, HUANG Jiao-hu,
LIU Tong, ZHANG Ding-guo

Chinese Journal of Energetic Materials, 2014, 22(1): 71–74

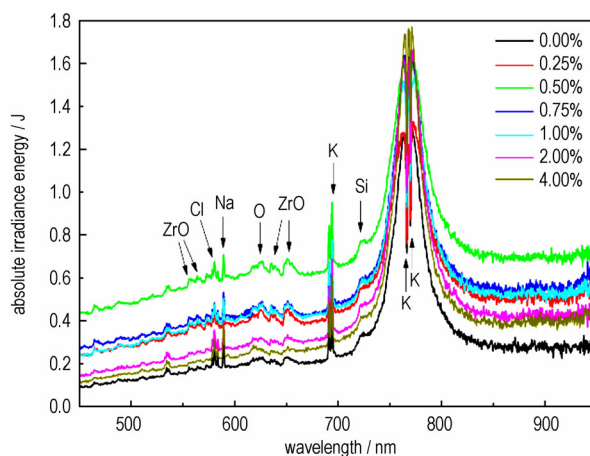


Ultrasonic vibration cutting (UVC) and conventional cutting (CC) tests on HMX based PBX explosive simulants were carried out. Cutting temperature of machined surface and cutting tool nose were detected by infrared thermal imager in the machining process.

Influence of CNTs on Thermal Behavior and Light Radiation Properties of Zr/KClO₄ Pyrotechnics

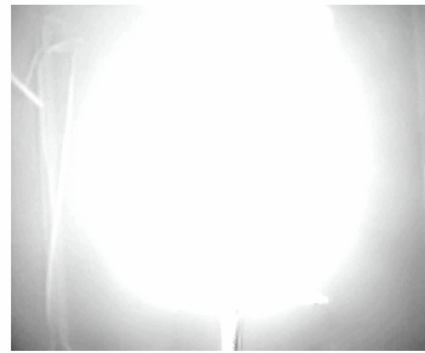
LIU Li-ming, KANG Xiao-li, YI Yong, ZHANG Hong-fang,
LUO Jiang-shan, TANG Yong-jian

Chinese Journal of Energetic Materials, 2014, 22(1): 75–79



Carbon nanotubes (CNTs) with catalytic property, high specific surface area, strong adsorption capacity and high strength were introduced in Zr/KClO₄ pyrotechnic compound. The effect of carbon nanotubes on the thermal decomposition and light radiation property of Zr/KClO₄(60/40) pyrotechnic compound used in the pump sources was studied by differential thermal analysis technology and photoelectric detection technology.

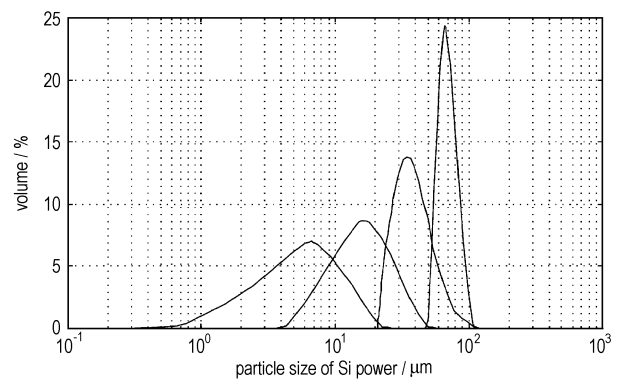
Preparation of Nano-CuO/CNTs Composite and its Effect on Luminous Intensity of Pyrotechnics Composites Containing KClO_4



BA Shu-hong, YAN Ming-hui, ZHOU Long, CHENG Xiu-lian, WANG Gui-ping, WAN Xin-guo, DU Xue-feng
Chinese Journal of Energetic Materials, 2014, 22(1): 80–83

CuO/CNTs nano composite particles were prepared and their effect on luminous intensity of pyrotechnics composites containing KClO_4 was studied.

Effect of Particle Gradation of Delay Composition on Delay Precision

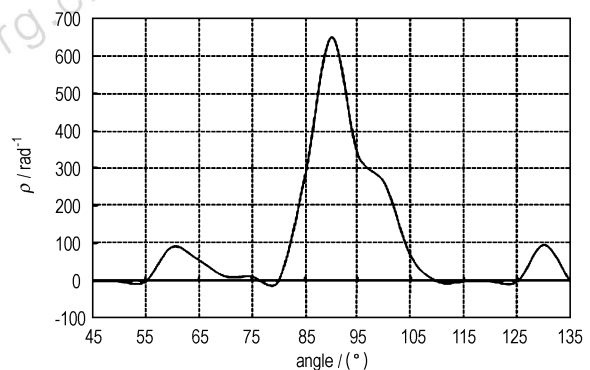


ZHANG Jian-fu, HU Yan-chen

Chinese Journal of Energetic Materials, 2014, 22(1): 84–88

The Si powder and CuO powder with different particle sizes were prepared. The Si-CuO delay composition with different gradation specifications were mixed and prepared. The delay precision of various delay composition was studied.

Lethality Investigation of Azimuthal Warhead

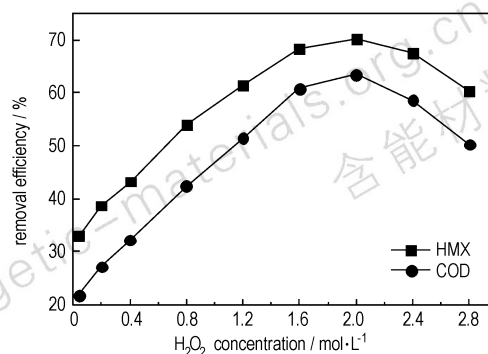


ZHU Xu-qiang, HUANG Chuan, LI Yan-chun, MEI Xin-liang, CHENG Yi

Chinese Journal of Energetic Materials, 2014, 22(1): 89–93

A fragment muzzle velocity formula used in limited angles of extension line opposite to azimuthal detonating point of azimuthal warhead was deduced, and tungsten cylinder fragment and tungsten sphere fragment azimuthal warheads were designed to validate the model by experiments.

Degradation of HMX Production Wastewater by Fenton Oxidation

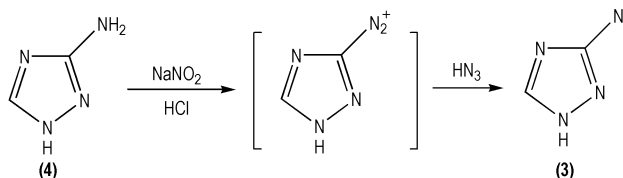


JIAO Wei-zhou, GUO Liang, LIU You-zhi, LIU Wen-li, LI Jing, XU Cheng-cheng

Chinese Journal of Energetic Materials, 2014, 22(1): 94–99

Effect of H₂O₂ concentration on the removal efficiency of HMX was investigated with the removal efficiency of HMX and COD.

Progress of 3-Azido-1,2,4-Triazole and Its Derivatives



XIAO Xiao, GE Zhong-xue, WANG Wei, LIU Qing, SU Hai-peng, LI Tao-qi, BI Fu-qiang, JI Xiao-tang

Chinese Journal of Energetic Materials, 2014, 22(1): 100–107

The progresses on the synthesis and performance of 3-azido-1,2,4-triazole and its derivatives were reviewed.

Review on the Preparation of Nano-energetic Materials Based on Self-assembly

SONG Shan, XIANG Bin, ZHANG Chao-yang, ZHOU Yang

Chinese Journal of Energetic Materials, 2014, 22(1): 108–115

The progresses on the preparation of nano-energetic materials based on self-assembly were summarized, analyzed and reviewed with 48 references.

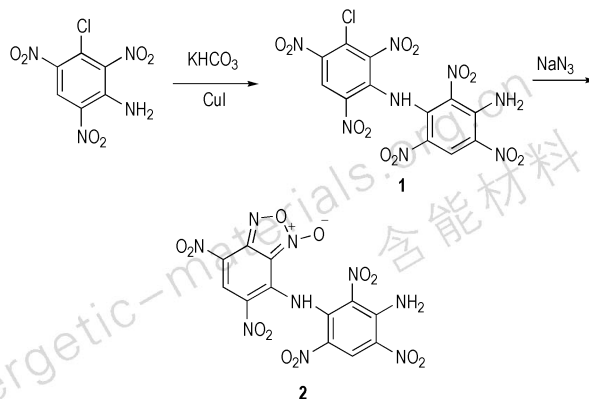
Review on Graphene Based Explosive Sensors

FANG Yu-feng, CHENG Xin-lu, ZHANG Chao-yang, ZHOU Yang

Chinese Journal of Energetic Materials, 2014, 22(1): 116–123

The superiorities of graphene in the sensor application were briefly analyzed. The progresses of study about graphene based explosive sensors, including electrochemical, surface enhanced Raman scattering (SERS), fluorescence resonance energy transfer (FRET), and electrochemical luminescence (ECL) sensors were emphatically introduced in recent years. The technical characteristics of existing graphene based explosive sensors were summarized with 51 references.

Synthesis and Properties of 7-(3'-Amino-2', 4', 6'-trinitrophenyl)-amino-4, 6-dinitrobenzofuroxan

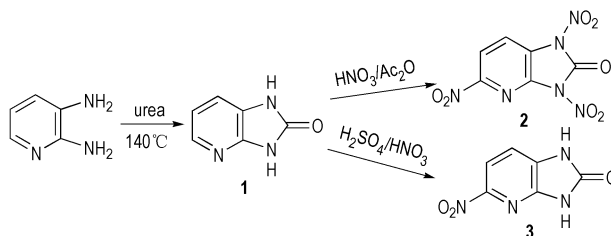


7-(3'-amino-2', 4', 6'-trinitrophenyl)-amino-4, 6-dinitrobenzofuroxan was synthesized using 3-chloro-2,4,6-trinitrobenzenamine as primary material by self-reaction and azidation. Its structure was confirmed by MS, IR and ^1H NMR. Thermal behavior was studied by DSC and TG.

HOU Ke-hui, LIU Zu-liang

Chinese Journal of Energetic Materials, 2014, 22(1): 124–125

Synthesis and Thermal Behavior of 1, 3, 5-Trinitro-2, 3-dihydro-1H-imidazo-[4, 5-b]pyridin-2-one

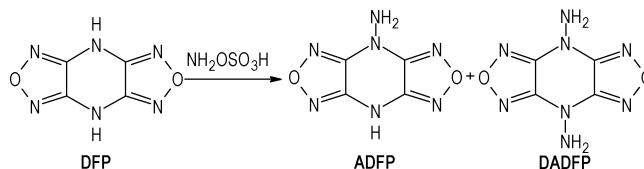


2,3-Dihydro-1H-imidazo[4, 5-b]pyridin-2-one (1) was synthesized by ring-closing reaction using 2,3-diaminopyridine as primary material. A novel compound 1, 3, 5-trinitro-2, 3-dihydro-1H-imidazo-[4, 5-b]pyridin-2-one (2) was obtained with it by nitration in the system of $\text{HNO}_3/\text{Ac}_2\text{O}$. Its structure was characterized by ^1H NMR, MS, IR and thermal behavior was studied by DSC and TG.

MA Cong-ming, LIU Zu-liang, YAO Qi-zheng

Chinese Journal of Energetic Materials, 2014, 22(1): 126–128

Synthesis and Properties for Two N-amino Derivatives of 4,8-Dihydrodifurazano[3,4-b,e]pyrazine



Two N-amino energetic derivatives of 4,8-dihydrodifurazano[3,4-b,e]pyrazine (DFP), 4-aminodifurazano[3,4-b,e]pyrazine (ADFP) and 4,8-diaminodifurazano[3,4-b,e]pyrazine (DADFP) were synthesized via N-amination reaction. The properties of ADFP and DADFP were estimated. The main thermal properties of ADFP and DADFP were analyzed by DSC and TG techniques.

LI Ya-nan, LIU Ning, LIAN Peng, GE Zhong-xue,
WANG Bo-zhou

Chinese Journal of Energetic Materials, 2014, 22(1): 129–131

Executive editor: WANG Yan-xiu JIANG Mei