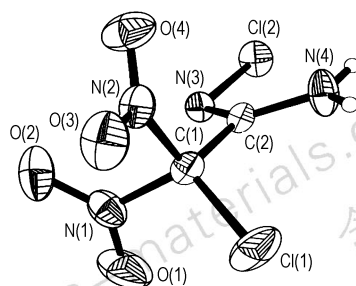


Synthesis and Crystal Structure of 1-Chloro-1,1-dinitro-2-(*N*-chloroamidino)-ethane

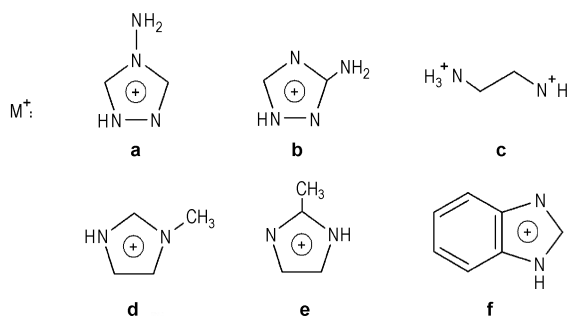
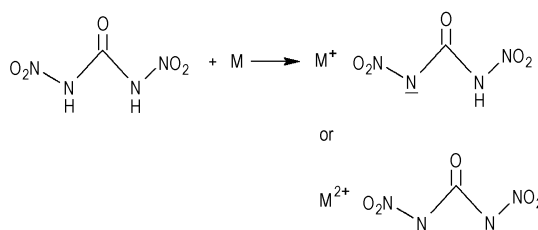


1-Chloro-1,1-dinitro-2-(*N*-chloroamidino)-ethane was synthesized. Its structure was identified by NMR, IR, MS and elemental analysis. The single crystal of 1-chloro-1,1-dinitro-2-(*N*-chloroamidino)-ethane was cultivated from dichloromethane. The reactivity of electrophilic substitution reaction of FOX-7 was confirmed, and the reaction mechanism was investigated.

ZHOU Cheng, ZHOU Yan-shui, HUO Huan,
BI Fu-qiang, WANG Bo-zhou, MA Ya-nan

Chinese Journal of Energetic Materials, 2011, 19(3): 243–246

Preparation and Characterization of Energetic Ionic Salts of *N,N*-Dinitrourea

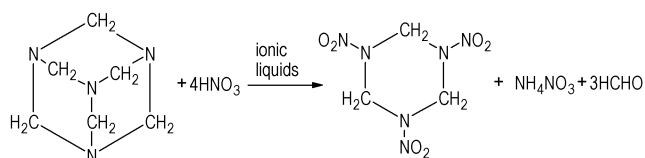


Through the reaction of ethylenediamine (EDA) and derivatives of triazole and imidazole with *N,N*-dinitrourea, six energetic ionic salts were prepared. The yield of salt from 4-aminotriazole and DNU could be up to 85% in acetonitrile at 10 °C for 2 h. The thermal stability of most salts surpasses DNU.

LI Ya-ni, YANG Jian-ming, YU Qin-wei,
XUE Yun-na, Lü Jian

Chinese Journal of Energetic Materials, 2011, 19(3): 247–251

Nitrolysis of Hexamethylenetetramine in Presence of Ionic Liquids

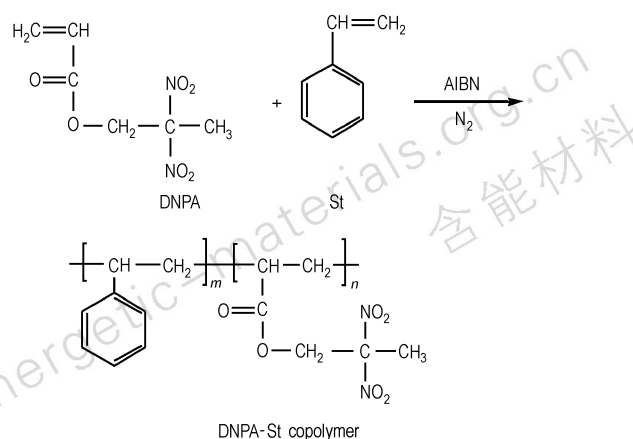


WANG Nai, SHI Yu, YANG Hong-wei,
CHENG Guang-bin, Lü Chun-xu

Chinese Journal of Energetic Materials, 2011, 19(3): 252–257

Direct nitrolysis of hexamethylenetetramine (HA) catalyzed by ionic liquids (ILs) was studied. ILs have observably catalytic activity on the direct nitrolysis of HA.

Copolymerization of 2, 2-Dinitropropyl Acrylate with Styrene and Property of Copolymer



ZHANG Gong-zheng, XIANG Xing,
FANG Yong-xi, WANG Xiao-chuan

Chinese Journal of Energetic Materials, 2011, 19(3) : 258 –261

2,2-Dinitropropyl acrylate-styrene (DNPA-St) copolymer was synthesized by the free radical polymerization in ethyl acetate by using azobisisobutyronitrile as initiator. Structure and properties of DNPA-St copolymer were also characterized by FTIR, ¹H NMR and DSC measurements.

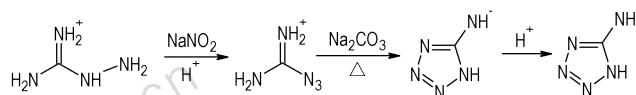
Synthesis and Thermal Decomposition Mechanism of 3,4-Bis(3',5'-dinitrobenzene-1'-yl) furoxan

LI Ya-nan, ZHANG Zhi-zhong, ZHOU Yan-shui,
WANG Bo-zhou, GE Zhong-xue

Chinese Journal of Energetic Materials, 2011, 19(3) : 262 –268

3,4-Bis(3',5'-dinitrobenzene-1'-yl) furoxan was synthesized via five-step reactions of oximation, diazotization, denitration, cyclization and nitration using benzonitrile as starting materials. The thermal decomposition mechanism of the target compound was studied and analysed with DSC, IR and TG/MS.

New Synthetic Route of 5-Aminotetrazole



HU Huan, YANG Hong-wei,
CHENG Guang-bin, Lü Chun-xu

Chinese Journal of Energetic Materials, 2011, 19(3) : 269 –271

5-Aminotetrazole was synthesized by diazotization, intramolecular cyclization and neutralization with aminoguanidine nitrate as primary materials.

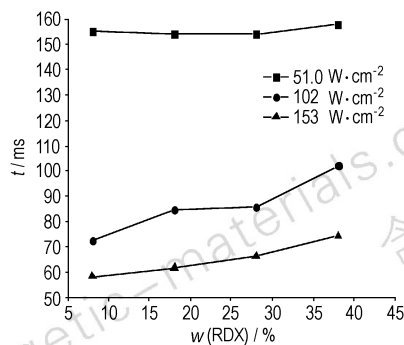
Properties of Composite Modified Double-based Propellant Containing CL-20

ZHENG Wei, WANG Jiang-ning, XIE Bo,
SONG Xiu-duo, TIAN Jun, YUAN Zhi-feng

Chinese Journal of Energetic Materials, 2011, 19(3) : 272 –275

The physic-chemical properties, safety properties, combustion properties and inner ballistic properties of CL-20/CMDB propellants were studied.

Laser Ignition Characteristics of RDX-CMDB Propellants

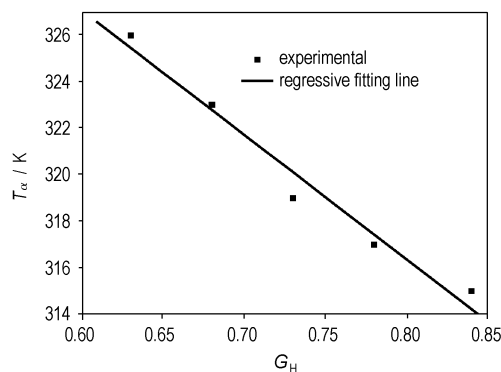


Laser ignition characteristics of RDX-CMDB propellants were investigated by CO₂ laser ignition with wavelength 10.6 μm. The effects of content of RDX, Al powder and burning catalysts on ignition characteristics of RDX-CMDB propellants were discussed.

HAO Hai-xia, PEI Qing, NAN Bao-jiang,
ZHANG Heng, XIAO Li-bai, ZHAO Feng-qj

Chinese Journal of Energetic Materials, 2011, 19(3): 276–281

Dynamic Mechanical Properties of DNTF/RDX-CMDB Propellant

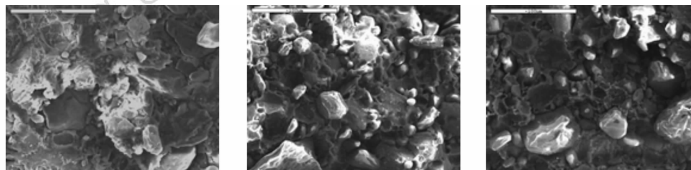


The characteristic values of dynamic mechanical properties at multi-frequency for DFR series propellants were obtained. Results show that the ratio of DNTF to RDX can obviously affect the dynamic mechanical properties of DFR propellants.

LI Liang-liang, WANG Jiang-ning, KONG Jun-li

Chinese Journal of Energetic Materials, 2011, 19(3): 282–286

Interfacial Mechanical Properties of Single-chamber Dual Thrust Grain for Modified Double-based Propellant

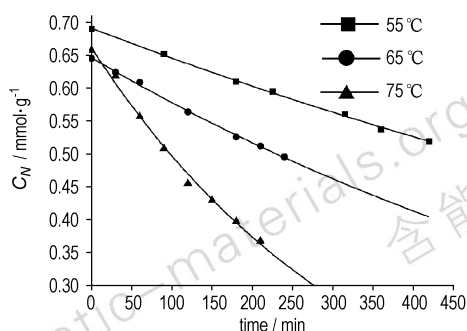


WANG Ying, ZHANG Xiao-hong,
CHEN Xue-li, XIE Wu-xi, FU Xiao-long

Chinese Journal of Energetic Materials, 2011, 19(3): 287–290

The mechanical properties of single-chamber dual thrust grain were studied especially on the interface of the two propellant grains by test machine, scanning electron microscopy (SEM) and X-ray photoelectron spectrum (XPS).

Reaction Kinetics and Viscosity Variation of HTPB/N100 Polymerization System

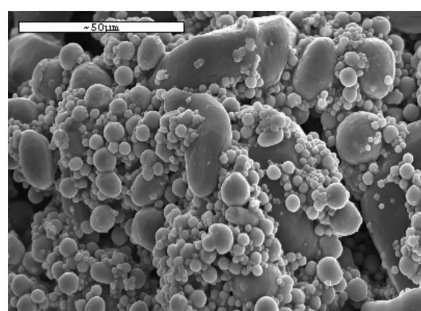


Hydroxyl-terminated polybutadiene (HTPB)/N100 reaction kinetics was investigated by method of the ratio of concentration and time. Matlab was applied to calculate the reaction order and rate constant in different temperatures. The effects of various additions of catalyst on reaction rate were studied.

ZHENG Shen-sheng, GUAN Li-feng,
DONG Lan, WU Kui-xian

Chinese Journal of Energetic Materials, 2011, 19(3): 291–294

RDX-Al system Coated with ETPE Binder

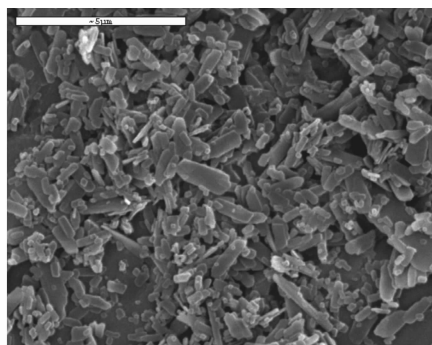


With energetic thermoplastic polyurethane elastomer (ETPE) as binder in RDX-Al system, measurement of contact angle of ETPE with RDX and Al powder, the scanning electron microscopy (SEM) photography and mechanical sensitivity of the moulding powder were studied.

DONG Jun, ZHAO Sheng-xiang, HAN Tao,
GAN Xiao-xian, ZHOU Wen-jing, ZHENG Lin,
FENG Xue-song, WANG Cai-ling

Chinese Journal of Energetic Materials, 2011, 19(3): 295–298

Preparation, Particle Size and Crystal Control of HNS-IV

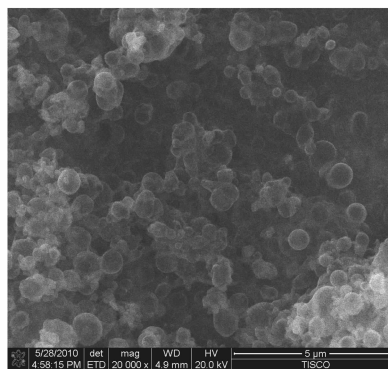


The ultra-fine 2, 2', 4, 4', 6, 6'-hexanitorstilbene (HNS-IV) was prepared by using solvent/anti-solvent recrystallization method. The effects of solvent factors, drying methods and process parameters, including the different solvents, anti-solvents, washing solvents, temperature, drying methods on the average particle size, particle size distribution and morphology of HNS, were studied.

SHANG Yan, YE Zhi-hu, WANG You-bing,
LI Ya-nan, WANG Bo-zhou

Chinese Journal of Energetic Materials, 2011, 19(3): 299–304

Preparation of Microspherical and Desensitized HMX



YUN Sheng, LIU Yu-cun, YU Yan-wu,
WANG Jian-hua, GAO Sen

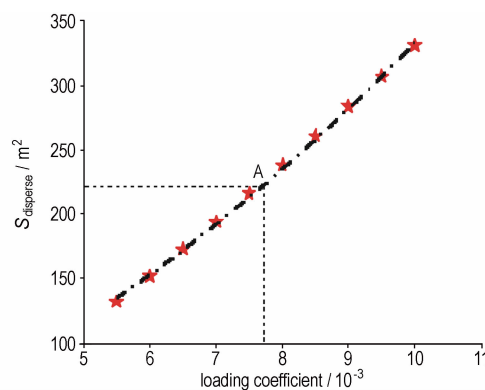
Chinese Journal of Energetic Materials, 2011, 19(3): 305 – 309

Under the optimal experimental condition, the average size of 450 nm microspherical and desensitized HMX was prepared by using pneumatic spray thinning, which is more thermostable and less sensitive than initial HMX.

Computational Model of Dynamic Dispersed Area of Liquid Fire-Extinguishing Ammunition

HAN Bao-cheng, LEI Hong-fei,
XU Yu-xin, WANG Shu-shan

Chinese Journal of Energetic Materials, 2011, 19(3): 310 – 314

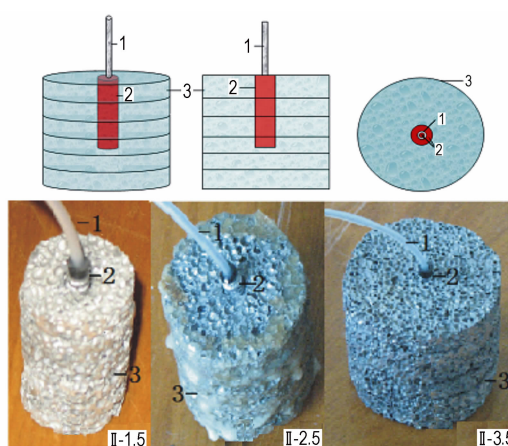


For the design of fire-extinguishing ammunition, the mathematic relationship between dynamic action area and stand-off distance was presented.

Influence of Aluminum Foams Shell on Shock Attenuation Underwater Explosions

NI Xiao-jun, SHEN Zhao-wu, YANG Chang-de

Chinese Journal of Energetic Materials, 2011, 19(3): 315 – 320

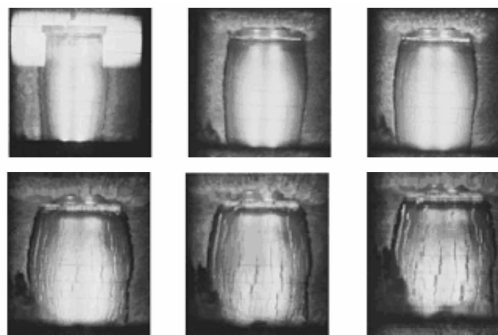


In order to study shock attenuation in aluminum foams, the different thickness of aluminum foam shells were made, shock attenuation in its was preliminarily investigated. Two types of PETN charges were used, one is the PETN itself, the others are confined by aluminum foam shell with thickness of 1.5 cm, 2.5 cm and 3.5 cm. The shock wave pressure-time curves were obtained at 0.5 m away from the charge.

Experimental Studies on Shell Fracturing and Jet Forming and Developing Process Driven by Detonation

JIANG Zhi-hai, LONG Xin-ping,
HAN Yong, JIANG Hong-bin

Chinese Journal of Energetic Materials, 2011, 19(3): 321–324

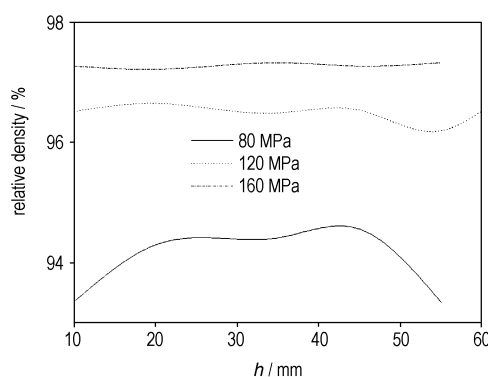


The shell distorting, expanding fracture photographs were obtained by the high-speed framing photography. The fragments of cylinder shell were collected through sand bags. The macroscopic and microscopic analysis of the fracture modes of the collected fragments were conducted by statistics and scanning electron microscopy (SEM) respectively.

Net Shaping Technology of Polymer-bonded Powder by Rubber Isostatic Pressing

LIANG Hua-qiong, HAN Chao, YONG Lian,
CHEN Xue-ping, YANG Yong-lin

Chinese Journal of Energetic Materials, 2011, 19(3): 325–329

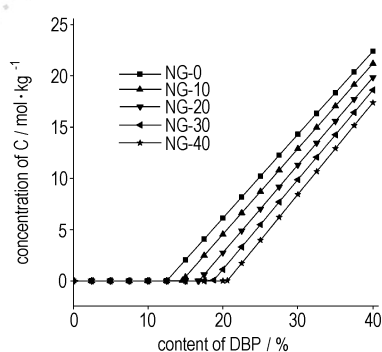


The polymer-bonded powder was shaped by rubber isostatic pressing (RIP). The higher the pressure, the better are the properties of compact. At the pressure of 160 MPa and initial relative density of 62%, the axial density difference of compact is less than 0.4%, and the RIP tends to isostatic pressing and becomes a net shaping process.

Effect of Dibutyl Phthalate on Combustion Carbon Residue of Double-based Propellant

ZHENG Wen-fang, PAN Ren-ming, LIN Xiang-yang,
GUO Chang-ping, FU Xiao-li

Chinese Journal of Energetic Materials, 2011, 19(3): 330–334



Effects of dibutyl phthalate on combustion carbon residue of double-based propellant was studied by using computational method of minimum free energy. The function of the critical value of dibutyl phthalate content and the nitroglycerine content, combustion pressure was established based on the computational results.

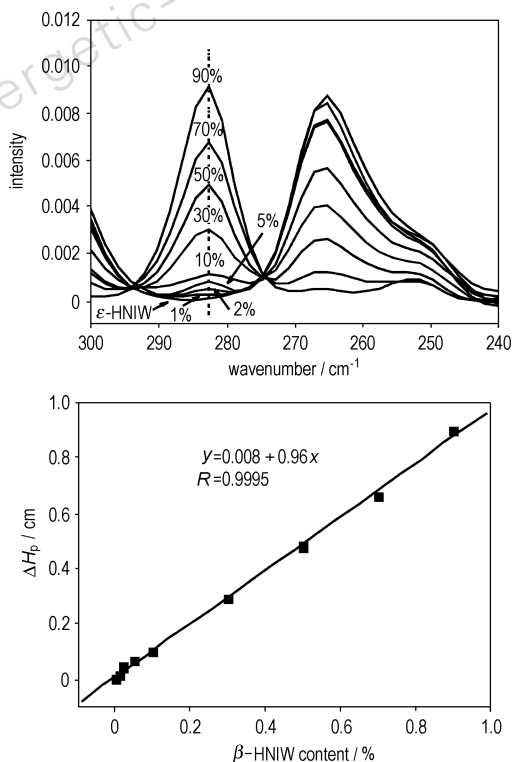
Application of a New Agent of Low Erosion in the Small Caliber Weapon

ZHENG Shuang, LIU Bo, LIU shao-wu, WANG Feng,
ZHANG Yuan-bo, YU Hui-fang, HAN Bing, LI Da
Chinese Journal of Energetic Materials, 2011, 19(3) : 335 – 338

A new organic silicon containing agent of low erosion which don't affect the characteristic of small caliber weapon was designed and tested. This technology was characterized by the closed-bomb tests, 5.8 mm rifle firing tests and erosion tube tests.

Quantitative Analysis of Mixtures of β -HNIW and ϵ -HNIW by Fourier Transform Raman Spectroscopy

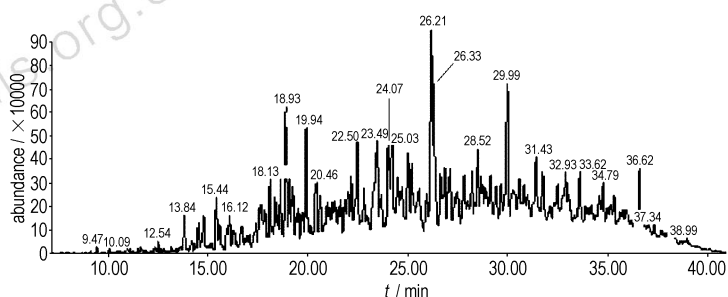
MENG Zheng, WEI Hong-yuan
Chinese Journal of Energetic Materials, 2011, 19(3) : 339 – 342



The linear relationship between the relative peak height of (β -, ϵ -) HNIW mixtures and the content of β -HNIW at 282.60 cm⁻¹ was studied.

Determination of Components in Rocket Kerosene by GC-MS

SHENG Tao, PENG Qing-tao,
XIA Ben-li, ZHANG Guang-you
Chinese Journal of Energetic Materials, 2011, 19(3) : 343 – 348

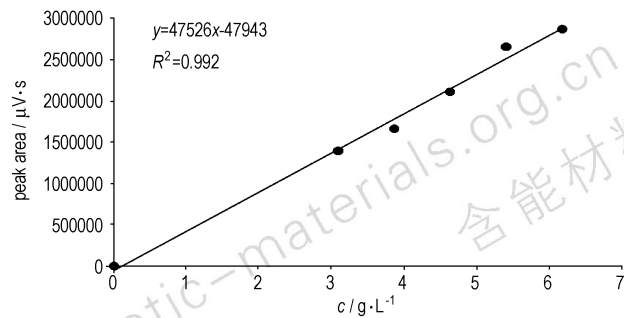


Components in rocket kerosene were analyzed by gas chromatography-mass spectrometry. In the condition adopted, 159 peaks were detected in total ion current chromatogram (TIC) of rocket kerosene, 131 peaks among them were identified.

Determination of Polyester in Desensitized Gun Propellant by Gas Chromatography

FAN Yong-hui, ZHAO Tie-zhu, YANG Cai-ning,
WANG Qiong-lin, YU Hui-fang

Chinese Journal of Energetic Materials, 2011, 19(3) : 349 – 351



A method to determinate the content of polyester in desensitized gun propellant by gas chromatography was presented with polyester degraded by sodium hydroxied solution.

Review on Overdriven Detonation of Double Layer High Explosive Charge

ZHANG Xian-feng, ZHAO Xiao-ning

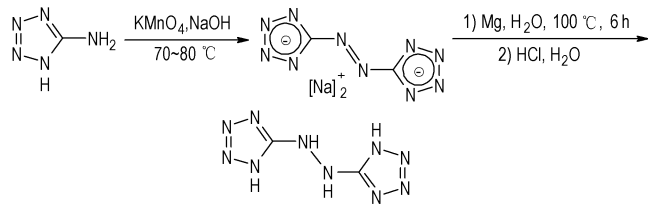
Chinese Journal of Energetic Materials, 2011, 19(3) : 352 – 360

The development of overdriven detonation (ODD) in double layer charge was introduced. The theoretical models, numerical simulation and testing and observation results of ODD were reviewed. The application and some experimental techniques of ODD were specially addressed. Some research proposals on experimental techniques and theoretical model were presented.

Synthesis and Properties of 5,5'-Hydrazinebistetrazole

ZHOU Xiao-qing, MA Qing, ZHANG Xiao-yu, CHENG Bi-bo,
HUANG Jing-lun, LIAO Long-yu, WANG Jun

Chinese Journal of Energetic Materials, 2011, 19(3) : 361 – 362



5,5'-Hydrazinebistetrazole (HBT) was synthesized by new process, and its thermal property and sensitivity were measured.

Executive editor: WANG Yan-xiu; JIANG Mei

Computer typesetter: LI Shao-hui