

Differential and Integral Isoconversional Non-linear Methods and their Application in Physical Chemistry Study of Energetic Materials (I): Theory and Method

HU Rong-zu, ZHAO Feng-qi, GAO Hong-xu,
ZHANG Hai, SONG Quan-cai

Chinese Journal of Energetic Materials, 2007, 15(2): 97 – 100

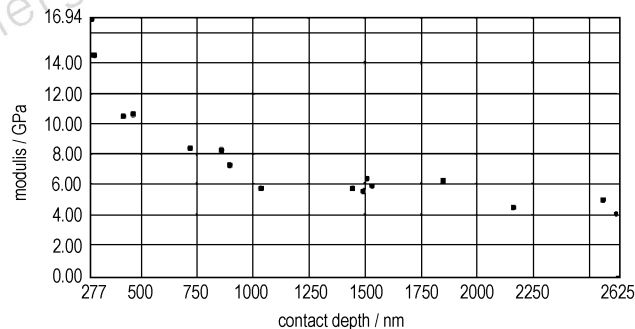


Differential and integral isoconversional non-linear equations and numerical methods for computing the apparent activation energy (E_a) from isothermal and non-isothermal data are presented.

Measurement of PBX Elastic Modulus by Nano-indentation

LI Ming, LAN Lin-gang, PANG Hai-yan,
WEN Mao-ping, JING Shi-ming

Chinese Journal of Energetic Materials, 2007, 15(2): 101 – 104

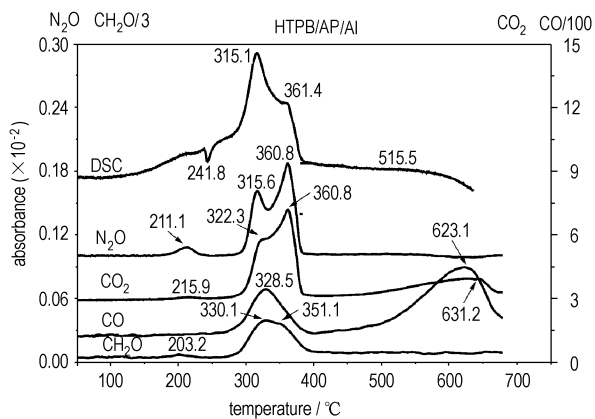
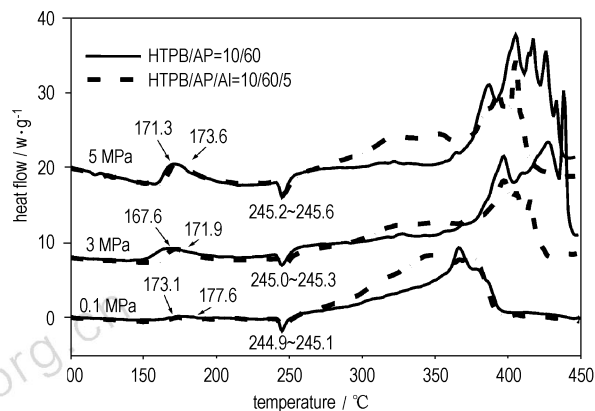


The modulus of the tested PBX decrease with the increasing of indenting depth, and keep stable as the depth approaching 800 nm.

Thermal Decomposition of HTPB/AP and HTPB/AP/Al Studied by DSC-FTIR

SHI Zhen-hao, LIU Zi-ru, CHEN Zhi-qun, ZHAO Feng-qi

Chinese Journal of Energetic Materials, 2007, 15(2): 105 – 108



The thermal decomposition of HTPB/AP/Al were investigated by DSC-FTIR.

Preparation and Characteristics of Mixture Explosive of Urea Nitrate and RDX

ZHOU Run-qiang, CAO Duan-lin, WANG Jian-long,

LI Yong-xiang

Chinese Journal of Energetic Materials, 2007, 15(2): 109 – 111

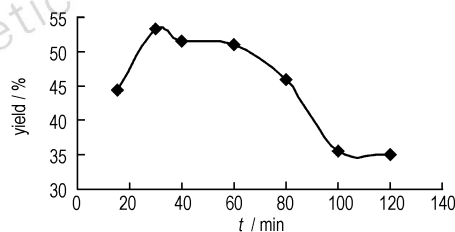
A mixture explosive was synthesized by reaction of urea with waste nitric acid from RDX plants.

Effect of the First Reaction Time on the Preparation of HMX

LI Quan-liang, WANG Jian-long, CHEN Jun

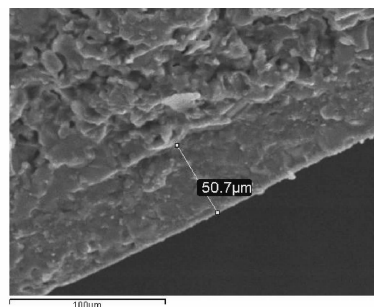
Chinese Journal of Energetic Materials, 2007, 15(2): 112 – 113

HMX was prepared by the way of acetic anhydride. The total yield improves at first and then decreases as the time of the first reaction increase.



Study on Moisture-Resistant Black Powder

CUI Qing-zhong, JIAO Qing-jie, REN Hui, YANG Rong-jie
Chinese Journal of Energetic Materials, 2007, 15(2): 114 – 117



Black powder was coated with GZ-1 type silicon resin, and its moisture absorption is decreased about 58%. The flame sensitivity and output properties are almost same as that of uncoated black powder.

Nitration of Aromatic Compounds in Brønsted Acidic Ionic Liquid

YUE Cai-bo, WEI Yun-yang, LÜ Min-jie

Chinese Journal of Energetic Materials, 2007, 15(2): 118 – 121

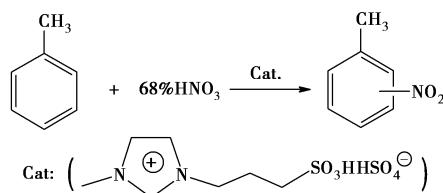
Various aromatic compounds, including alkyl and halo benzenes, were nitrated to mononitro compounds in reasonable yields (40% – 80%) with NH_4NO_3 from 0 °C to room temperature in Brønsted acidic ionic liquids with [Hmim] $[\text{CF}_3\text{COO}]$ and [Hmim] $[\text{HSO}_4]$ as solvent and catalyst respectively.

Green Nitration of Toluene in Ionic Liquids

FNAG Dong, SHI Qun-rong, GONG Kai,

LIU Zu-liang, LÜ Chun-xu

Chinese Journal of Energetic Materials, 2007, 15(2): 122 – 124

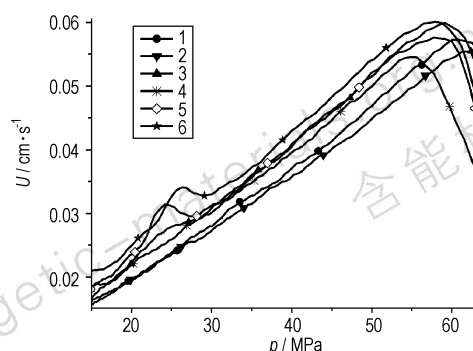


Novel Brønsted ionic liquid 1-methyl-3-propanesulfonic acid imidazolium hydrogen sulfate (MIMPSHSO_4) was prepared as catalyst for the green chemical processes of nitration reaction.

Burning Behavior of Nitramine Propellant under Low Pressure

ZHANG Zou-zou, JIANG Shu-jun

Chinese Journal of Energetic Materials, 2007, 15(2): 125–127



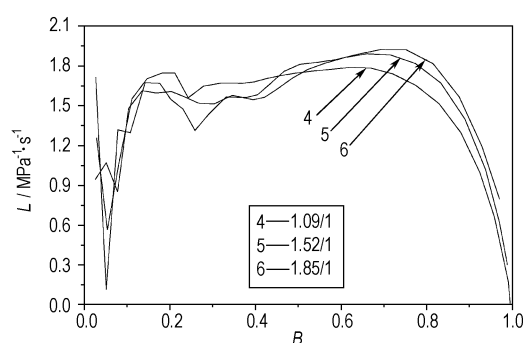
The effects of the ratio of RDX/NGu on the combustion behavior of nitramine propellants under low pressure were studied by the closed bomb test.

Effect of Grain Size on Progressive Combustion of the Variable Burning Rate Propellant

MA Zhong-liang, LI Zhi-liang, XU Fang-liang,

ZHANG Li-ping, XIAO Zhong-liang

Chinese Journal of Energetic Materials, 2007, 15(2): 128–130



Under the determination of the prescription and thickness of the inside and outside layers of the variable burning rate propellant, the ratio of length to diameter affect on the progressive combustion more obviously.

Initiation Technique of Semiconductor Bridge (SCB) Slapper

YANG Zhen-ying, YANG Shu-bin, WANG Xin-cai, YIN Zhi-nan

Chinese Journal of Energetic Materials, 2007, 15(2): 131–133

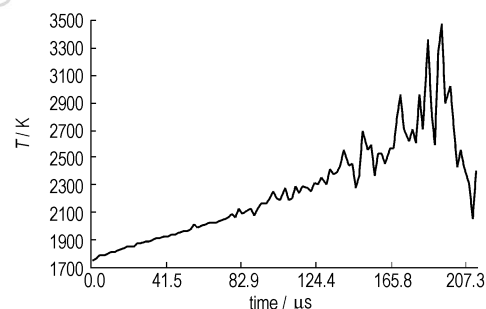
Semiconductor chip was made by microelectronic technology. Parameters of semiconductor bridge section were optimized. Test research of initiation of HNS-IV explosive by SCB slapper and factors that influencing firing energy were carried out as well.

Measurement of the Semiconductor Bridge (SCB) Plasma Temperature by the Double Line of Atomic Emission Spectroscopy

FENG Hong-yan, LI Yan, ZHANG Lin, WU Rong,

WANG Jun-de, ZHU Shun-guan

Chinese Journal of Energetic Materials, 2007, 15(2): 134–136



The time evolution of the SCB plasma temperature was measured with a system based on the double line of atomic emission spectroscopy.

Changes of Two Bridgewire Resistance at Different Time in Accelerated Life Test

TU Xiao-zhen, ZHAO Qing

Chinese Journal of Energetic Materials, 2007, 15(2): 137–139

The resistances of gold bridgewire at different time after the simulating accelerated life test have significant changed by t -significance level test. However, elinvar bridgewire resistances have no significant changes at the same test.

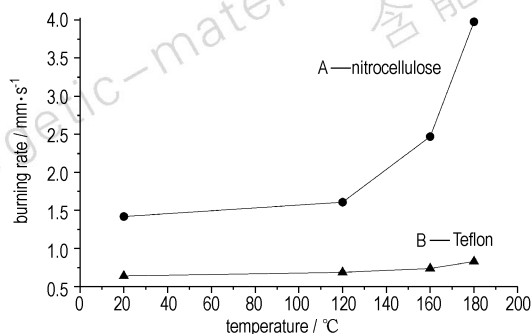
Safety Fault Analysis of Igniter Based on FTA and BN

HU Yan-chen, WANG Pei-lan, ZHENG Heng, LI Hao
Chinese Journal of Energetic Materials, 2007, 15(2): 140 – 143

The safety fault of a flame-delay igniter was analyzed by using the Bayesian Networks (BN) method.

Effects of the Binding Agents on the Burning Rate of the Tungsten Delay Composition

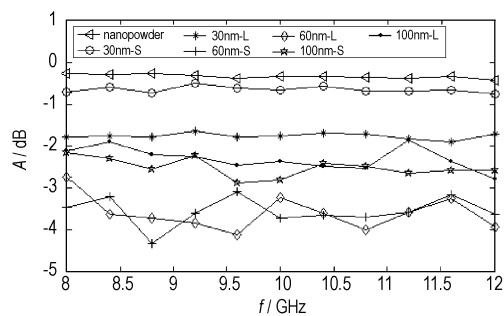
XU Jun-feng, PENG Jia-bin, WANG Xiu-zhi,
 ZHANG Zhou-mei, ZHANG Ye
Chinese Journal of Energetic Materials, 2007, 15(2): 144 – 147



Two tungsten type delay composition with nitrocellulose and Teflon were prepared and their burning rate were studied.

Microwave Attenuation Performance of Different Carbon Nano-Materials

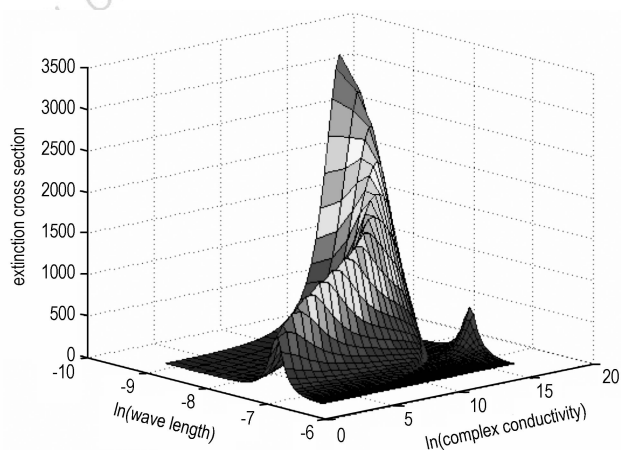
WANG Hong-xia, LIU Dai-zhi, ZHAI Wei-gang
Chinese Journal of Energetic Materials, 2007, 15(2): 148 – 150



With the static measuring method, the microwave attenuation performances of carbon nano-powder, carbon nanotubes, and carbon nanofibers were studied. The average attenuation values per quality density for 7 kinds of carbon nano-materials with different structures and sizes were given.

Infrared Extinction of Super-fine Ceramic Fiber Coated Nickel

REN Hui, JIAO Qing-jie, KANG Fei-yu, CUI Qing-zhong
Chinese Journal of Energetic Materials, 2007, 15(2): 151 – 154

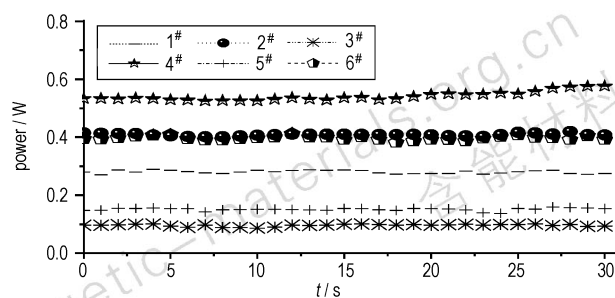


The infrared extinction of super-fine ceramic fiber coated nickel was studied with numerical simulation and experimental measurement. The rules were researched that extinction property of fiber changed with wavelength, aspect ratio of fiber, conductivity, refractive index, and dielectric constant. The extinction coefficients were compared between metal coated fibers and uncoated fiber.

Effects of Oxidants on RP Smoke to Anti-10.6 μm Laser

ZHENG Fu-xing, WANG Xuan-yu, SONG Li,
WANG Xiao-yang

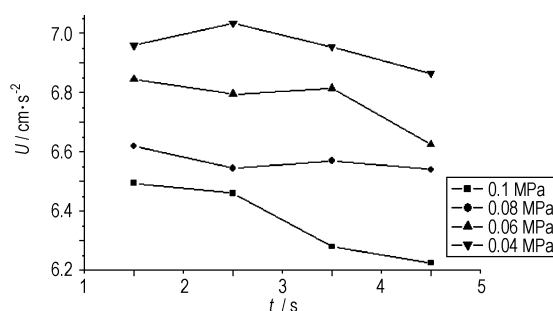
Chinese Journal of Energetic Materials, 2007, 15(2): 155–157



In a medium-sized smoke chamber, the anti-10.6 μm Laser characteristics of the smokes with different oxidant were tested. The laser power curve of smoke were listed.

Effect of Different Vacuum Pressure on the Expanding Velocity of the Smoke Cloud

CHEN Ning, PAN Gong-pei, CHEN Hou-he, HOU Wei
Chinese Journal of Energetic Materials, 2007, 15(2): 158–161



The effects of vacuum degree on smoke expanding velocity were studied; the relation between expanding velocity of powder smoke cloud (u) and times (t) in different vacuum degrees was presented.

Experimental Study on Over-loading of Strong Flash Pyrotechnic Composite

BA Shu-hong, JIAO Qing-jie, REN Hui, ZHANG Qing-li
Chinese Journal of Energetic Materials, 2007, 15(2): 162–164

Over-loading of strong flash pyrotechnic composite was studied by using drop hammer simulation device.

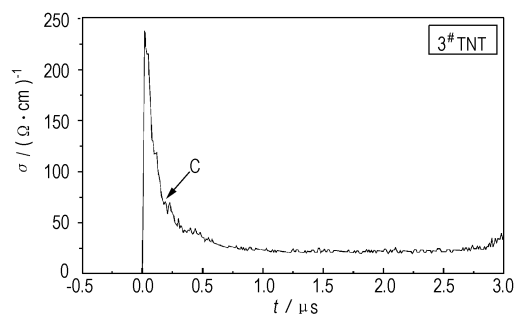
Application of Wide Range Pressure Gauge to DDT Experiments on Energetic Materials

WEN Shang-gang, GONG Yan-qing, DONG Shu-nan,
WANG Shi-ying, TANG Shi-you
Chinese Journal of Energetic Materials, 2007, 15(2): 165–168

A wide-range piezoelectric pressure gauge was used to explore the pressure change at different position in DDT experiments on solid energetic materials.

Electrical Conductivity of TNT and RHT-906 Explosives in Initiation Process

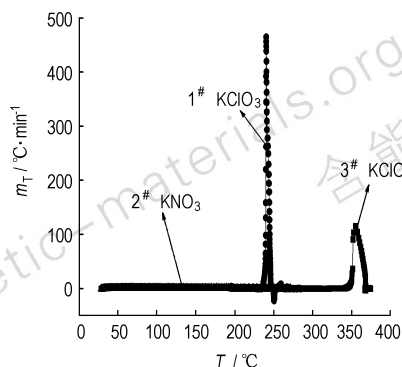
JIANG Zhi-hai, LONG Xin-ping, HE Bi, HAN Yong,
JIANG Xiao-hua, LU Bin
Chinese Journal of Energetic Materials, 2007, 15(2): 169–171



The typical electrical conductivity profile was obtained in the shock initiation process of TNT explosive by scheme of planar measurement.

Thermal Safety of Three Kinds of Firework

ZANG Na, QIAN Xin-ming

Chinese Journal of Energetic Materials, 2007, 15(2): 172 – 174

The onset exothermic temperatures of three pyrotechnic samples were investigated by accelerating rate calorimeter. The maximum temperature rise rates of three pyrotechnic samples were also investigated by accelerating rate calorimeter.

Thermal Decomposition Kinetics of Class 2 Coal Mine Permissible Emulsion Explosive

YIN Li, GUO Zi-ru

Chinese Journal of Energetic Materials, 2007, 15(2): 175 – 177

The thermal decomposition process of class 2 coal mine permissible emulsion explosive was studied by DSC. The kinetic parameters (the apparent activation energy and pre-exponential factor) of the process were calculated by the Kissinger method, Flynn-Wall-Ozawa method and integral isoconversional non-linear method.

Degradation of Explosive Wastewater Containing RDX with Ozone Oxidization

AI Cui-ling

Chinese Journal of Energetic Materials, 2007, 15(2): 178 – 180

The efficiency and the affecting factors of ozone oxidization for RDX-containing explosive wastewater by letting continuously O_3 into the water were studied, and the concentration of RDX and COD value of the wastewater were monitored.

Effects of Metal Ions on the TNT Degradation with O_3/H_2O_2

WU Yao-guo, ZHAO Chen-hui, WANG Qiu-hua,

FENG Wen-lu

Chinese Journal of Energetic Materials, 2007, 15(2): 181 – 184

Effects of metal ion on the TNT degradation with O_3/H_2O_2 were studied.

Detonation Performance Calculation of Explosive with Visualized Fortran VLW Code

ZHU Ming-shui, HE Bi, JIANG Xiao-hua, LONG Xin-ping,

WU Xiong

Chinese Journal of Energetic Materials, 2007, 15(2): 185 – 187

Based on the FORTRAN VLW code, a visualized software was developed for calculating the detonation performance of explosives.

Research on Surface Coating of Nitroamine Explosives Particles

AN Chong-wei, SONG Xiao-lan, WANG Yi, GUO Xiao-de,

LI Feng-sheng

Chinese Journal of Energetic Materials, 2007, 15(2): 188 – 192

The development of the surface coating researches on Nitroamine Explosives (RDX, HMX and CL-20) and various kinds of coating materials, methods and mechanics are presented, and the issues and priorities in the future research are also proposed.