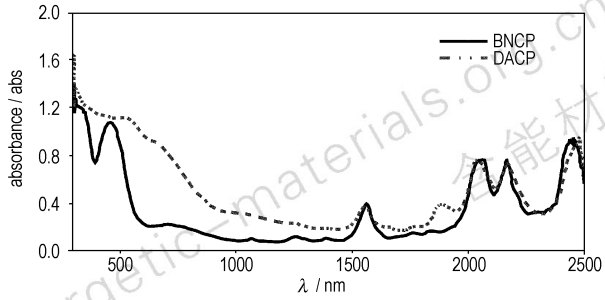
Interactional Mechanism Between Laser and Energetic Compound

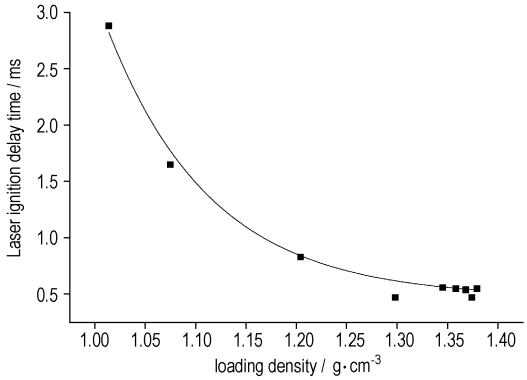


SHENG Di-lun, ZHU Ya-hong, CHEN Li-kui, YANG Bing, WANG Yan-lan

Chinese Journal of Energetic Materials, 2008, 16(5): 481 – 486

The characteristic absorb spectra of some primary explosives and explosives were measured, their laser sensitivities were compared with the different wavelengths laser testes. The firing energy of DACP is only tenth at 635 nm to other wavelengths.

Relationship between Laser Ignition Delay Time and Charge Density of $Zr/KClO_4$

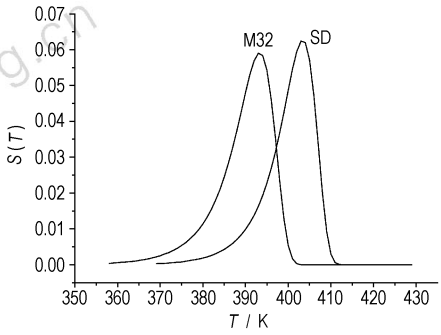


YAN Nan, ZENG Ya-qin, FU Hong

Chinese Journal of Energetic Materials, 2008, 16(5): 487 – 489

Laser ignition delay time of $Zr/KClO_4$ over a large range of loading pressures or charge densities was studied. The high precision relationship between ignition delay time and density was obtained.

Thermal Safety of Tri-base Gun Propellants M32 and SD

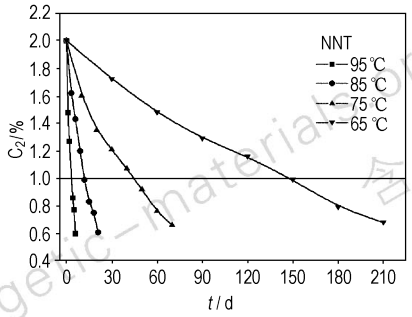


ZHAO Feng-qi, HU Rong-zu, GAO Hong-xu

Chinese Journal of Energetic Materials, 2008, 16(5): 490 – 493

Thermal safety of infinite cylindrical and spheroidic tri-base gun propellants M32 and SD was studied and evaluated by DSC and data obtained by Zhang-Hu-Xie-Li's formula, Smith's equation and Wang-Du's formulas.

The Kinetics of the Effective Stabilizer Consumption Reaction in High Energy Gun Propellants



HENG Shu-yun, HAN Fang, Zhou Ji-hua, LIU Shao-wu, TAN Hui-min, HU Ling

Chinese Journal of Energetic Materials, 2008, 16(5): 494 – 497

The content of the effective stabilizer in high-energy gun propellants was measured. The kinetic parameters E_a, ln$A$ of effective stabilizer consumption reaction and the probable mechanism function $g(\alpha)$ were obtained. The stabilizer consumption reaction could be described preferably by $g(\alpha) = -\ln(1-\alpha)$.

Applied Study on Estimate-calculating Tensile Intensity of Dissolution-adding-plasticity Propellant by Polymer Theory

DU Ping, HE Wei-dong, WANG Ze-shan

Chinese Journal of Energetic Materials, 2008, 16(5): 498 – 501

The methods of calculating tensile intensity of single-base propellant and dissolution-adding-plasticity propellant were theoretically studied from the side of chemical bond and intermolecular force. Tensile intensities of single-base propellant and dissolution-adding-plasticity propellant were tested practically and compared with theoretical intensities in the meantime.

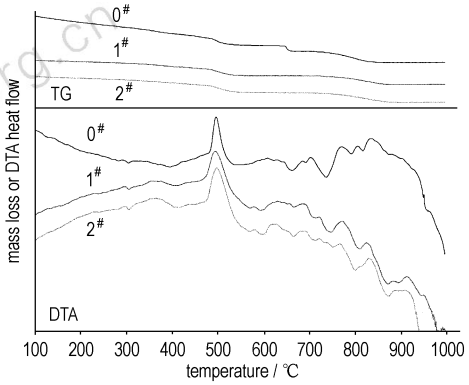
Analysis on Combustion Characteristics of B/$BaCrO_4$ Delay Composition

WU Shuang-zhang, SHEN Rui-qi, YE Ying-hua, LI Shi-lei

Chinese Journal of Energetic Materials, 2008, 16(5): 502 – 506

Combustion characteristics of B/$BaCrO_4$ delay composition were studied by the technique of high-speed camera.

Effect of Nano-Fe_2O_3 on the Burning Characteristics of Tungsten Type Delay Composition

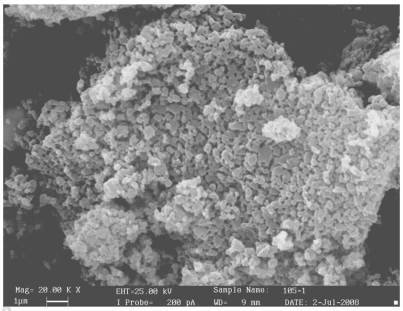


HUANG Yin-sheng, LI Jin-tao, CUI Chen-chen, LIU Jie, ZANG Xiao-wei, DUAN Jin-jun

Chinese Journal of Energetic Materials, 2008, 16(5): 507 – 510

Three kinds of tungsten type delay compositions were tested by TG-DTA method to investigate the effects of nano-Fe_2O_3 on combustion properties.

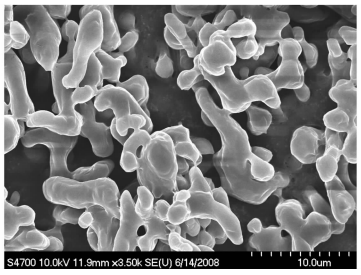
Study on Superfine HNS Particles



WANG Ping, YU Wei-fei, ZHANG Juan, LIU Chun
Chinese Journal of Energetic Materials, 2008, 16(5): 511 – 514

The effects of temperature and polymer additive on superfine HNS particles were studied.

Preparation and Characterization of Ultra-fine A_5 Booster



LIANG Yi-qun, ZHANG Jing-lin, JIANG Xia-bing, WANG Bao-guo
Chinese Journal of Energetic Materials, 2008, 16(5): 515 – 518

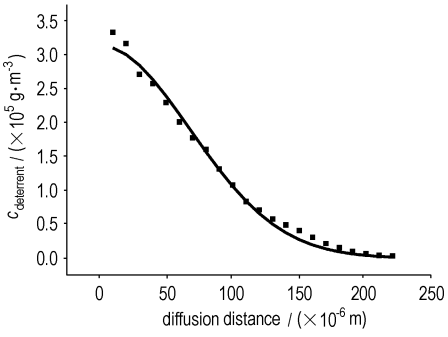
The mould powder of ultra-fine A_5 booster was acquired by aqueous suspension technology. The component and pattern of ultra-fine A_5 booster were characterized by FT-IR and SEM. Comparison between ultra-fine A_5 and commercial A_5 by impact sensitivity, shock wave sensitivity and energy output were carried out.

Effect of Surface Area on Sensitivity and Properties of BNCP Superfine Particles

YU Wei-fei, CHEN Ya, NIE Fu-de, ZHI Yong-fa, ZENG Gui-yu, WANG Ping, ZHANG Qi-rong
Chinese Journal of Energetic Materials, 2008, 16(5): 519 – 520

Superfine particles of tetraammine-cis-bis (5-nitro-2H-tetrazolato-N^2) cobalt (Ⅲ) perchlorate (BNCP) were obtained with fluid milling and cryogenic drying methods with absolute ethanol as non-solvent.

Determination of Diffusion Coefficient of Deterrent in EI Propellant by FTIR Microspectroscopy



PAN Qing, WANG Qiong-lin, YU Hui-fang, LUAN Jie-yu
Chinese Journal of Energetic Materials, 2008, 16(5): 521 – 524

The concentration profile of polymeric deterrent of newly manufactured propellant was in accord with the 2nd Fickian diffusion model. The diffusion coefficient of deterrent in manufacturing process could be calculated by the concentration profile equation.

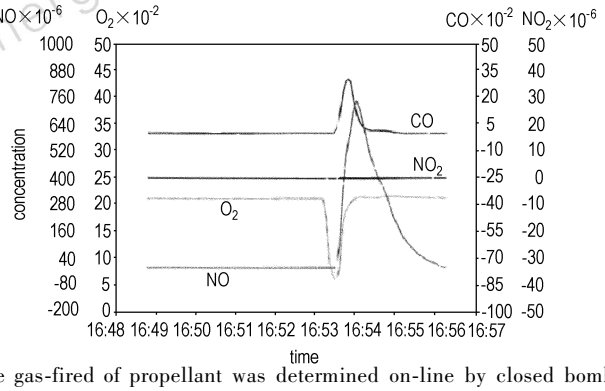
Effect of Environmental Humidity on the Thermal Decomposition Kinetics of One New-type Propellant

ZHANG Jun, LU Gui-e, JIANG Jin-yong

Chinese Journal of Energetic Materials, **2008**, **16**(5): **525 – 526**

The thermal decomposition kinetics of one new-type propellant was studied. The different environmental humidity was achieved by using six kinds saturation salting liquid such as $CaCl_2 \cdot 6H_2O$, $NaHSO_4$, $NaNO_2$, NH_4Cl, KBr, $NaBrO_3$ in the experiment. The apparent activation energy and frequency constant were obtained.

Determination Methods for the Gas-fired of Propellant



HU Lan, ZHANG Gao, WANG Jing-na, GAO Lang-hua

Chinese Journal of Energetic Materials, **2008**, **16**(5): **527 – 530**

The gas-fired of propellant was determined on-line by closed bomb and the device, including oxygen, carbon monoxide and nitric oxide. The device was designed for collecting and measuring gas.

HMX Content in PBX Booster Measured by Visible Spectro-photometric Method

LIANG Yi-qun, ZHANG Jing-lin, JIANG Xia-bing

Chinese Journal of Energetic Materials, **2008**, **16**(5): **531 – 534**

The content of HMX in PBX booster was measured by visible spectro-photometric method. The condition of color reaction of HMX was determined and selected in visible spectrum range.

Reliability Assessment for Initiating Devices Based on Bootstrap

WEN Yu-quan, HONG Dong-pao

Chinese Journal of Energetic Materials, **2008**, **16**(5): **535 – 538**

The reliability assessment method for initiating devices with small samples based on the Bootstrap was proposed, and the estimation of the scale parameter was revised, with that the accuracy of assessment was proved by stimulation calculation and test.

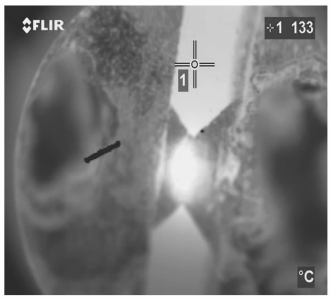
Study on the Aging Effect of a Detonator

TU Xiao-zhen, LI Jing-ming, WEI Xing-wen, ZHOU Yang, WANG Pei, LI Wei

Chinese Journal of Energetic Materials, **2008**, **16**(5): **539 – 542**

The detonator's single function time, mass and the impact sensitivity of inner charge at different times simulating accelerated life test have significant changed.

Preparation and Properties of Thin Film Bridge EED



WANG Guang-hai, LI Guo-xin, A Su-na
Chinese Journal of Energetic Materials, 2008, 16(5): 543 – 546

A butterfly metallic film bridge was prepared, which was made by adopting a magnetron sputtering technology with a mask. It shows the thermal distribution of the thin film bridge. Its performance was studied.

Radiofrequency Sensitivity of Hot-bridge Electric Explosive Device

CHEN Ming-hua, ZHANG Guo-an, LU Rui-qing, XING Li-ping
Chinese Journal of Energetic Materials, 2008, 16(5): 547 – 549

The sensitive frequencies and radiofrequency sensitivities for three different hot-bridge electric explosive devices were obtained by experiments based on conduction method and up-down method, the fire powers at 50% fire/no fire calculated and the results were analyzed.

Reliability Test Information Entropy under the Special Condition

CAI Rui-jiao, DONG Hai-ping
Chinese Journal of Energetic Materials, 2008, 16(5): 550 – 552

Reliability test information entropy of pass-fail product and particularity of high reliability product with margin were studied. The conclusion can be made that reliability test information entropy is equivalent to reliability test information quantity under the condition of zero failure.

Validity of Variables-Attributes Assessment Method for Reliability of Initiating Explosive Devices

DONG Hai-ping, CAI Rui-jiao, MU Hui-na
Chinese Journal of Energetic Materials, 2008, 16(5): 553 – 555

By Monte Carlo, the validity of variables-attributes assessment method was studied. Twenty kinds of qualified products and two kinds of unqualified artificially products were assessed with variables-attributes method and run-down method respectively. The conclusions from two methods are consistent.

Order Restricted Analysis of Reliability Tests for Explosive Initiator

HONG Dong-pao, ZHAO Yu, WEN Yu-quan
Chinese Journal of Energetic Materials, 2008, 16(5): 556 – 559

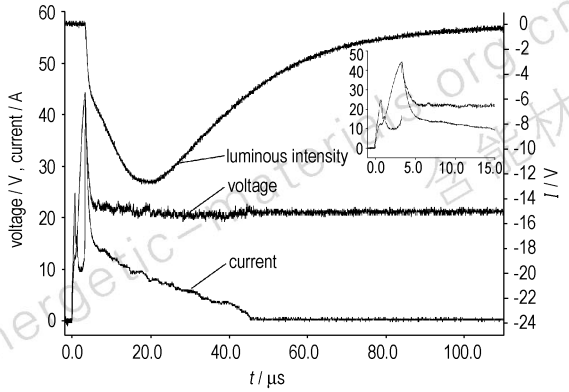
Langile test was used to estimate the parameters of the sensitivity distribution. Then the test data was processed with the isotonic regression, from which the order restricted maximum likelihood estimate was obtained. The simulations were performed at a variety of conditions for the Langlie test. And a new analysis method of reliability tests for explosive initiator was proposed to improve the analysis of reliability explosive initiator with small samples.

Firing Reliability Design of Hot Bridge-wire Electro-Explosive Device

DONG Hai-ping, CAI Rui-jiao, MU Hui-na, CAO Jian-hua
Chinese Journal of Energetic Materials, 2008, 16(5): 560 – 563

A firing reliability design method for hot-wire electric explosive device was put forward. Firstly, the temperature rising model of bridge-wire and temperature distribution model of explosive were constructed; secondly, the critical firing energy of explosive was calculated based on energy-balance equation and selected parameters; finally, margin of firing reliability of initiator was calculated.

Measurement and Calculation for SCB Electro-explosion Energy Conversion Features

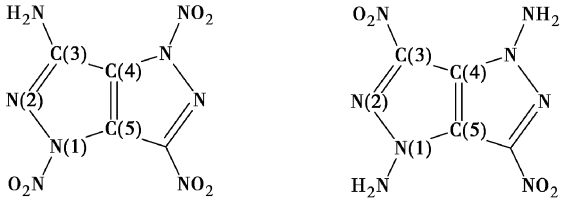


ZHANG Wen-chao, YE Jia-hai, QIN Zhi-chun, ZHOU Bin, TIAN Gui-rong, XU Zhen-xiang

Chinese Journal of Energetic Materials, 2008, 16(5): 564 – 566

The evolution of semiconductor bridge (SCB)′s voltage, current and luminous intensity were measured simultaneously.

Theoretical Study on Relationship Between Structures and Properties of Pyrazole Compounds

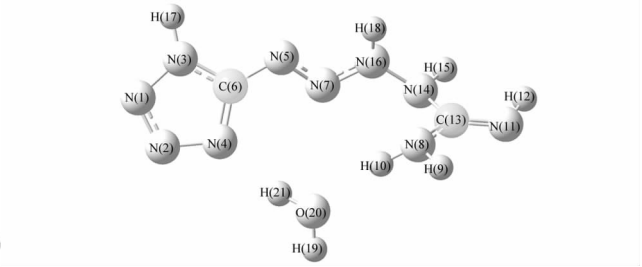


YIN Ming, SHU Yuan-jie, XIONG Ying, LUO Shi-kai, LONG Xin-ping, ZHU Zu-liang, DU Jun-liang

Chinese Journal of Energetic Materials, 2008, 16(5): 567 – 571

Pyrazole compounds were constructed and their properties were investigated by density functional theory. Their optimized geometry structures, electronic structures, heats of formation and density were calculated at the B3LYP/6-311G(d,p) level.

A Density Functional Theory Investigation on the Isomers of Tetrazene

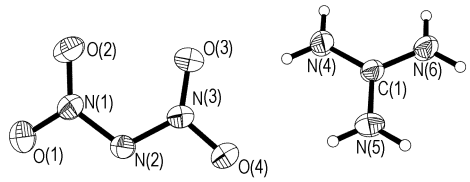


CUI Yan, ZHANG Tong-lai, ZHANG Jian-guo, YANG Li

Chinese Journal of Energetic Materials, 2008, 16(5): 572 – 576

The three isomers of tetrazene molecules were calculated at the B3LYP/6-311 + G** level.

Crystal Structure and Thermal Behavior of GDN

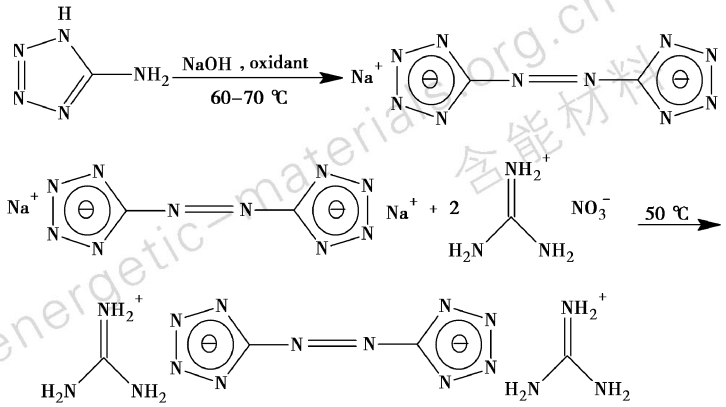


XU Kang-zhen, ZHAO Feng-qi, DING Li, WANG Han, LI Meng, CHANG Chun-ran, MA Hai-xia, SONG Ji-rong

Chinese Journal of Energetic Materials, 2008, 16(5): 577 – 580

Guanidine dinitramide ($[(NH_2)_2C{=}NH_2]^+ N(NO_2)_2^-$, GDN) was prepared by mixing ammonium dinitramide (ADN) and guanidine hydrochloride in water, and its structure was firstly determined by single-crystal X-ray diffraction.

Synthesis and Characterization of GZT



WANG Yi-hui, DU Zhi-ming, HE Chun-lin, CONG Xiao-min, WANG Hong-she, WANG Chun-ying
Chinese Journal of Energetic Materials, 2008, 16(5): 581 – 584

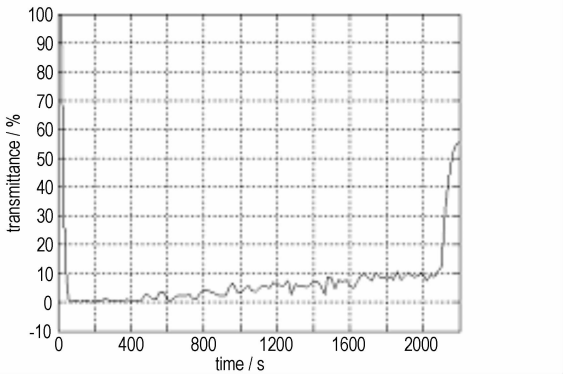
Guanidinium azotetrazolate (GZT) was synthesized from 5-AT by oxidation-reduction reaction and chemical combination reaction. The effects of reaction temperature, reaction time, molar ratio of reactants and NaOH concentration on the reaction were discussed.

Electric Spray Ionization Mass Spectrum of Tetrazene

LIU Jun-wei, ZHANG Jian-guo, ZHANG Dan-dan, ZHANG Tong-lai, YANG Li
Chinese Journal of Energetic Materials, 2008, 16(5): 585 – 587

The possible fragmentation pathways of tetrazene were determined by the electric spray ionization mass spectrum, and fragmentation mechanism was analyzed.

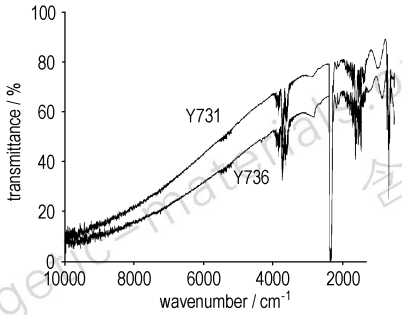
Infrared Images Shielded Characteristics of Carbon Nano-Materials



WANG Hong-xia, LIU Dai-zhi, SONG Zi-biao
Chinese Journal of Energetic Materials, 2008, 16(5): 588 – 591

Using large smoke chamber, the IR images shielded extinction performance of nano-graphite, carbon nano-tubes, carbon nano-fibers were tested in the wave-length range of 8 – 12 mm, the average far infrared extinction coefficients of 8 carbon nano-materials with different structures and sizes were given.

Application of Tiny Graphite Powder in Combustible Anti-infrared Smoke Screen

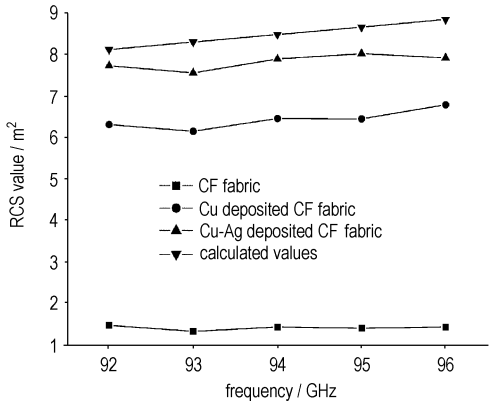


BA Shu-hong, WANG Nai-yan

Chinese Journal of Energetic Materials, 2008, 16(5): 592 – 594

Application of tiny graphite powder was studied in burnable anti-infrared smoke screen. Approach to produce proper graphite was investigated.

Cu-Ag Plating Carbon Fiber Fabric and its Radar Cross Section Speciality in 3 mm Wave Band



HOU Wei, PAN Gong-pei, GUAN Hua, ZHU Chen-guang

Chinese Journal of Energetic Materials, 2008, 16(5): 595 – 598

The Radar Cross Section (RCS) values of metal deposited carbon fiber fabric were compared with academic value in 3 mm wave band.

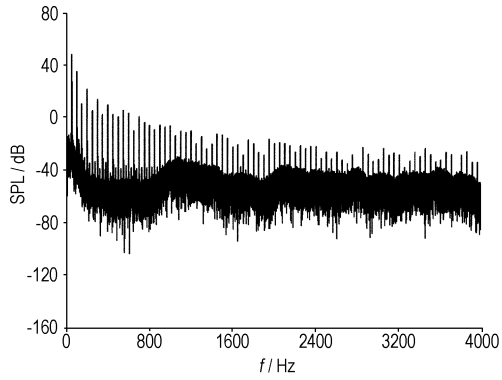
Extinction Performance of Nano-Ni Powder to 1.06 μm and 10.6 μm Laser

LIU Xiang-cui, ZHENG Wei-ping

Chinese Journal of Energetic Materials, 2008, 16(5): 599 – 602

The extinction and suspending capabilities of nano-Ni powder smoke were studied. It is a new obscurant material that can effectively attenuate 1.06 μm and 10.6 μm laser.

Experimental Study on Acoustic Frequency Property of Pulsating Combustion Underwater for Pyrotechnic Composition



OUYANG De-hua, PAN Gong-pei, GUAN Hua, HOU Wei, FAN Lei, DU Xue-feng

Chinese Journal of Energetic Materials, 2008, 16(5): 603 – 605

The acoustic frequency property of the pyrotechnic composition pulsating combustion underwater was studied experimentally; the relationship between sound pressure level (*SPL*) and acoustic frequency (*f*) was presented.

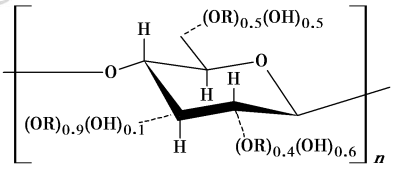
Study on the Coating of Potassium Chlorate with PVB and its Safety

QIAN Xin-ming, WANG Peng-fei

Chinese Journal of Energetic Materials, **2008**, **16**(5): **606 – 608**

Potassium chlorate was coated with polyvinyl butyral by the method of liquid phase separation. The safety of pyrotechnical composed by coated potassium chlorate was improved significantly.

Molecular Design and Synthesis of Hydroxyalkyl Cellulose Ether Nitrate as Novel Energetic Adhesive

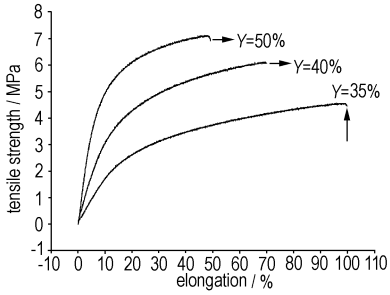


SHAO Zi-qiang, ZHANG You-de, YANG Fei-fei, Lü Shao-yi, WANG Ji-xun

Chinese Journal of Energetic Materials, **2008**, **16**(5): **609 – 613**

Molecular structures of nitrate ester of hydroxylethyl cellulose ether (NHEC), nitrate ester of hydroxylpropyl cellulose (NHPC) and nitrate ester of cellulose glycerol ether (NGEC) were designed and the performances of nitrogen content, glass transition temperature and Young modulus were calculated by using Synthia module of Materials Studio.

Synthesis and Characterization of GAP-based Thermoplastic Elastomer

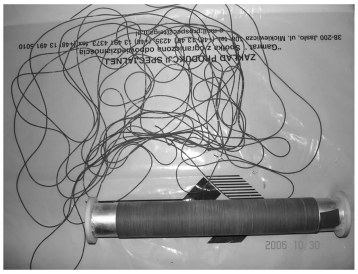


JIAN Xiao-xia, XIAO Le-qin, ZUO Hai-li, ZHOU Wei-liang, XU Fu-ming

Chinese Journal of Energetic Materials, **2008**, **16**(5): **614 – 617**

An energetic thermoplastic elastomer was synthesized through melt-prepolymerization method by using prepolymerized GAP as soft segments, 4,4-diphenylmethane diisocyanate and 1,4-butanediol as hard segments for the purpose of using as insensitive high energy propellants.

Miniature Detonating Cord (MDC) for Breaking Organic Glass Plates

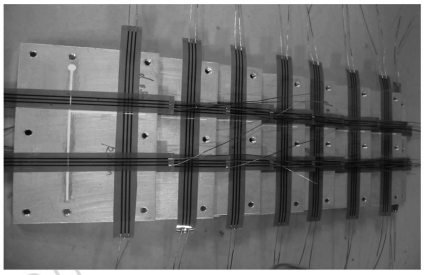


Bogdan ZYGMUNT

Chinese Journal of Energetic Materials, **2008**, **16**(5): **618 – 620**

Miniature detonating cords (MDC) of 1 mm in diameter were manufactured and their detonation performance were studied.

Delay Time of Detonation Wave of Superfine Insensitive HMX Charged in Limited Corner Channel

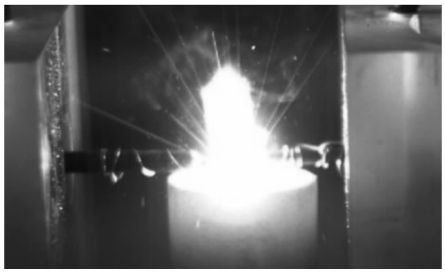


LI Xiao-gang, JIAO Qing-jie, WEN Yu-quan

Chinese Journal of Energetic Materials, 2008, 16(5): 621 – 624

The delay of detonation propagation of superfine insensitive HMX in convex corner channel was studied. The dimension analysis method was adopted to induce the theory formula.

Experimental Study on Electrical Ignition Properties of Liquid Propellant Droplet

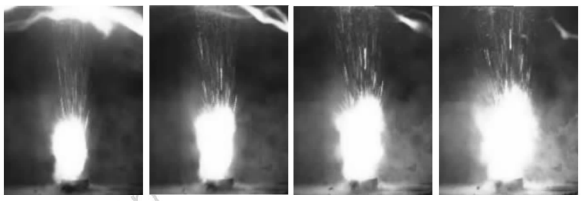


YU Yong-gang, LI Ming, ZHOU Yan-huang, LU Xin

Chinese Journal of Energetic Materials, 2008, 16(5): 625 – 628

An experimental device of electrical ignition of HAN-based liquid propellant droplet was designed. By using high-speed camera system, the ignition properties of HAN-based liquid propellant LP1846 single droplet were observed at different electrical heating speeds.

Transient Combustion Performance of Igniter for Base Bleed Unit Under Rapid Depressurization



LU Chun-yi, ZHOU Yan-huang, YU Yong-gang

Chinese Journal of Energetic Materials, 2008, 16(5): 629 – 632

The performance of three types of igniters of base bleed unit with different charge under rapid depressurization was studied by simulation experiment.

Progress in Plasma Ignition of Insensitive High Energy Propellants

XIAO Zheng-gang, YING San-jiu, ZHOU Wei-liang, XU Fu-ming

Chinese Journal of Energetic Materials, 2008, 16(5): 633 – 638

The concepts, frames, keynotes and related research tactics in plasma ignition of insensitive high-energy propellants are proposed out based on the discussion of the feasibility.

Review on Decreasing the Ignition Energy by Semi-Conductor Bridge

XU Lu, ZHANG Lin, FENG Hong-yan, LIU Li-juan, ZHU Shun-guan

Chinese Journal of Energetic Materials, 2008, 16(5): 639 – 646

Several effective routes to decrease the ignition energy of SCB were summarized based on the analysis to the characteristics of SCB, the ignition mechanism, the properties of charge and the charge conditions.

Executive editor: WANG Yan-xiu; Computer typesetter: LI Shao-hui