

Estimation of Critical Temperature of Thermal Explosion for Some Furazano-fused Cyclic Compounds Using Non-isothermal DSC

HU Rong-zu, GAO Hong-xu, ZHAO Feng-qi, ZHANG Hai, MA Hai-xia, XU Kang-zhen

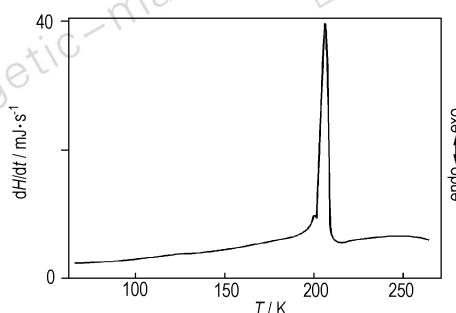
Chinese Journal of Energetic Materials, 2009, 17(6): 635 – 642

Two general expressions, six derived formulae and their numerical methods for estimating the critical temperature of thermal explosion (T_b) for energetic materials (EMs) are presented. The values of T_b for seven furazano-fused cyclic compounds are calculated.

Theory and Numerical Method of Calculating the Kinetic Parameters of Exothermic Decomposition Reaction of Energetic Materials from Peak Temperature of DSC Curves at Constant Heating Rates

HU Rong-zu, GAO Hong-xu, ZHAO Feng-qi, ZHANG Hai, ZHAO Hong-an, MA Hai-xia, XING Xiao-ling, XUE Liang
Chinese Journal of Energetic Materials, 2009, 17(6): 643 – 649

Two mathematical expressions and their numerical methods for calculating the kinetic parameters of exothermic decomposition reaction of EMs from peak temperature of DSC curves at constant heating rates based on Kooij's formula and van't Hoff's formula were presented. The values of activation energy and pre-exponential constant for Keto-RDX calculated by two derived expressions.

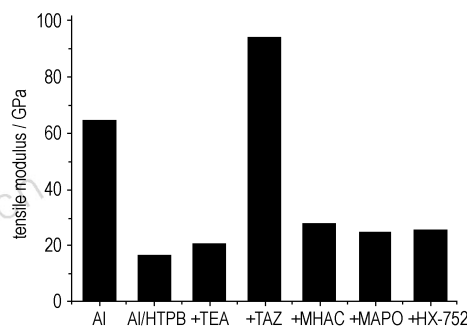


Molecular Simulation of Mechanism of Bonding Agents in HTPB Solid Propellant Model

JIAO Dong-ming, YANG Yue-cheng, QIANG Hong-fu, WU Wen-ming

Chinese Journal of Energetic Materials, 2009, 17(6): 650 – 654

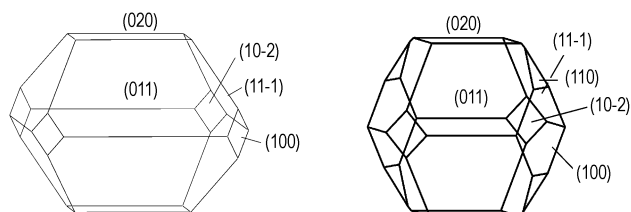
MD method was adopted to simulate the effect of different bonding agents on the mechanical properties of interfaces constructed by HTPB, bonding agent and crystal face of Al.



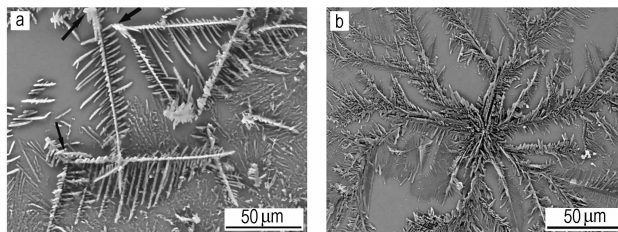
Prediction of Crystal Morphology of HMX

DUAN Xiao-hui, WEI Chun-xue, PEI Chong-hua, LI Jin-shan
Chinese Journal of Energetic Materials, 2009, 17(6): 655 – 659

Prediction of the crystal shapes of HMX polymorph has been performed by using AE and BFDH models. The solvent effects on crystal morphology are investigated through analyzing the surface structures of the morphologically important crystal faces.



Fractal Growth of RDX

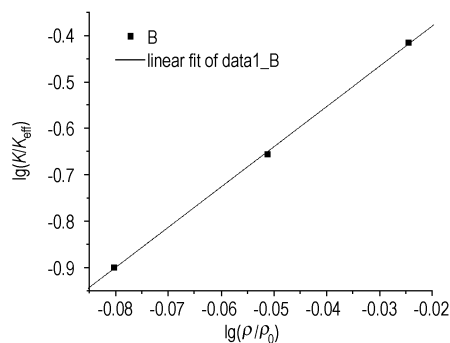


CUI Cai-ping, HUANG Hui, DUAN Xiao-hui, ZENG Gui-yu,
MA Yong-jun, PEI Chong-hua

Chinese Journal of Energetic Materials, 2009, 17(6): 660–663

Various fractal structures of RDX were prepared on glass substrate using solvent evaporation method. The effects of solute and surfactant concentration on the morphology were investigated.

On Predicting Effective Elastic Modulus of PBX by Modified Hashin-Shtrikman Model

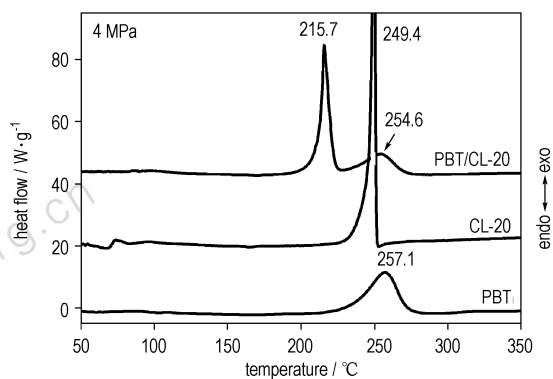


JING Shi-ming, LI Ming, LONG Xin-ping

Chinese Journal of Energetic Materials, 2009, 17(6): 664–667

An alternative approach, the modified Hashin-Shtrikman model is explored to determine the effective elastic modulus of PBX.

Interactions of PBT with Some High Energy Oxidizers by Thermal Analysis

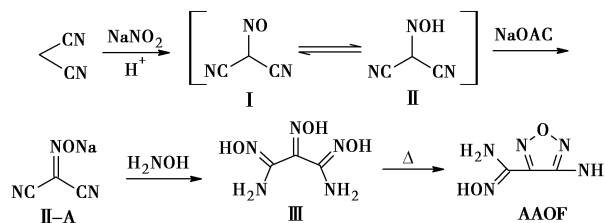


ZHANG La-ying, HENG Shu-yun, LIU Zi-ru, ZHANG Gao,
SHAO Ying-hui, WANG Lin, ZHAO Feng-qi, TAN Hui-min

Chinese Journal of Energetic Materials, 2009, 17(6): 668–673

The interactions for PBT with CL-20, DNTF, TNAZ and ADN were investigated by using PDSC and TG-DTG.

Reaction Mechanism Studies on Synthesis of 3-Amino-4-amidoximinofurazan



WANG Bo-zhou, LUO Yi-fen, ZHOU Yan-shui,
LAI Wei-peng, LIU Qian

Chinese Journal of Energetic Materials, 2009, 17(6): 674–677

The synthesis of 3-amino-4-amidoximino furazan is proposed as a five-step reaction: nitrosation, rearrangement, salification, oximation, and dehydration cyclization.

Synthesis of 1-Methyl-4,5-dinitroimidazole

CAO Duan-lin, WANG Xiao-jun, YANG Cai-yun, SONG Lei,
HAN Hao, ZHOU Jun-feng, CHANG Jun-fang
Chinese Journal of Energetic Materials, 2009, 17(6): 678 – 680

1-Methyl-4, 5-dinitroimidazole was synthesized by the nitrification from 1-methylimidazole. The structure of the product was characterized by IR element analysis, ^1H NMR and MS. The thermolysis property of 4,5-MDNI also was studied by DSC.

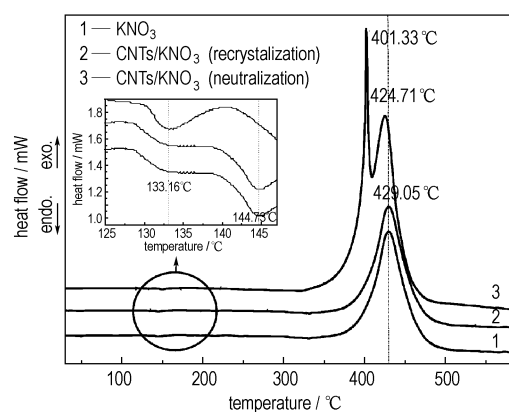
Synthesis and Properties of Tri-arms Glycidyl Azide Polymer Azide

XU Ruo-qian, JI Yue-ping, DING Feng, WANG Wei,
LAN Ying, LIU Ya-jing
Chinese Journal of Energetic Materials, 2009, 17(6): 681 – 684

Two bran-new Tri-arms Glycidyl Azide Polymer Azide (GAPA) are obtained by the reaction of nitration and azidation of polyepichlorohydrin (PECH). The glass transition temperature of GAPA is $-52.86\text{ }^\circ\text{C}$, and its thermal decomposition temperature is $247.9\text{ }^\circ\text{C}$.

Preparation and Characterization of Nano-CNTs/ KNO_3 Composites

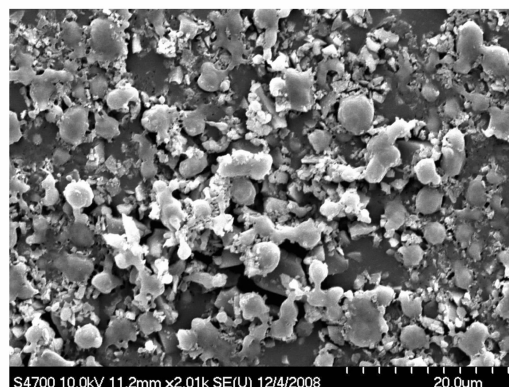
CUI Qing-zhong, JIAO Qing-jie, LIU Shuai
Chinese Journal of Energetic Materials, 2009, 17(6): 685 – 688



The CNTs/ KNO_3 composites were prepared by recrystallization and neutralization method respectively. Thermal decomposition temperature of CNTs/ KNO_3 prepared by neutralization decreases about $28\text{ }^\circ\text{C}$.

Preparation of RDX/ SiO_2 Booster Membrane by Sol-Gel Method

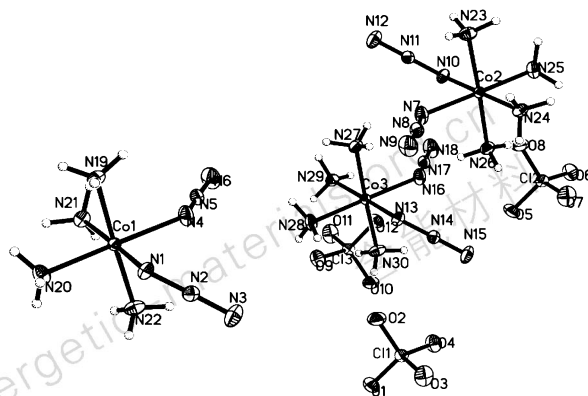
JIANG Xia-bing, LIANG Yi-qun, ZHANG Jing-lin,
CHEN Jian-shen
Chinese Journal of Energetic Materials, 2009, 17(6): 689 – 693



The 80% RDX/ SiO_2 booster membranes were prepared by manual spin coating method in the process of silica sol transiting into gel and the definite solution dissolving RDX and FPM_{2602} adding into this system sequentially, the SEM photographs of the membrane were also presented.

Crystal Structure and Laser Sensitivity of Cobalt (III)

Complex $[\text{Co}(\text{NH}_3)_4(\text{N}_3)_2]\text{ClO}_4$

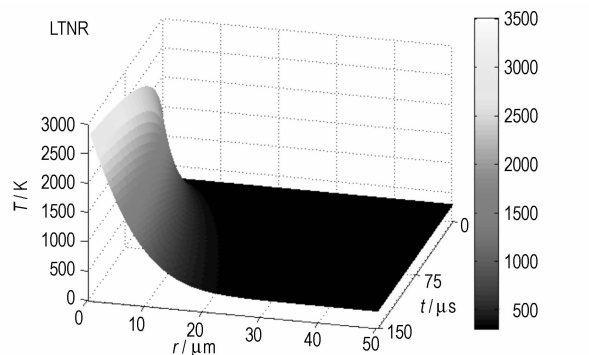


SHENG Di-lun, MA Feng-e, ZHANG Yu-feng,
ZHU Ya-hong, CHEN Li-kui, YANG Bin

Chinese Journal of Energetic Materials, 2009, 17(6): 694–698

The single crystal of tetraamminediazido cobalt (III) perchlorate (DACP) was prepared and characterized. Its crystal structure was determined by a X-ray single crystal diffractometer. The compound is very sensitive to laser with a wavelength of 635 nm.

Validation of Energy Transfer and Continuum Heat Transfer Model for the SCB Plasma

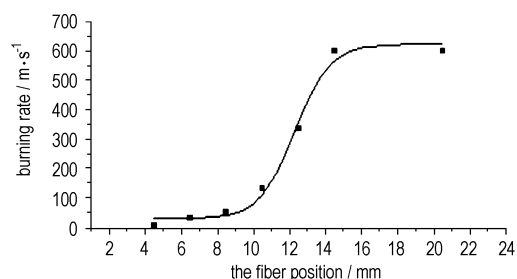


FENG Hong-yan, ZHU Shun-guan, ZHANG Lin, LI Yan,
SHEN Rui-qi

Chinese Journal of Energetic Materials, 2009, 17(6): 699–703

A continuum model is developed to analyze the heat transfer to a explosive material particle from SCB plasma. The Numerical solution was about the spatio-temporal distributing of a LTNR particle temperature.

Combustion Characteristic of Thruster with High Burning Rate Pyrotechnics

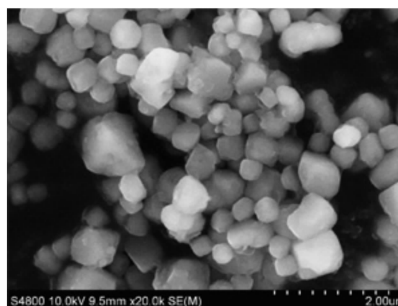


LIU Ling, LI Guo-xin, JIANG Xin-guang, LAO Yun-liang
Chinese Journal of Energetic Materials, 2009, 17(6): 704–707

An optical fiber burning rate test was introduced and the ignition-combustion rate of pyrotechnic short-pulse propelling work device was tested so as to study the regulation of burning rate and combustion characteristic in high burning rate work device, and ensure the thrust output stability of the device.

Combustion Process of Fog Aerosol and Its Influence on Condensation Nucleus Growth Behavior

DAI Meng-yan, HU Bi-ru, ZHANG Xue-ao, WU Wen-jian
Chinese Journal of Energetic Materials, 2009, 17(6): 708 – 712



The combustion process of fog aerosol and formation of condensation nucleus were investigated by high-speed photograph techniques, TG, DTA and SEM. The growing process of condensation nucleus and the formation of fog droplet are related with the super saturation produced by the cooling and expanding of the hot air mass produced by combustion.

Pressing Damage of RDX-based Polymer Bonded Explosive

LIANG Hua-qiong, YONG Lian, TANG Chang-liang,
CHEN Xue-ping, HUANG Jiao-hu
Chinese Journal of Energetic Materials, 2009, 17(6): 713 – 716



The interfaces between RDX and binder were easily debonded because of improper bonding choice and pressing process conditions. The two RDX-based polymer bonded explosives (PBXs) were pressed by steel die to obtain the pressing damage mechanisms.

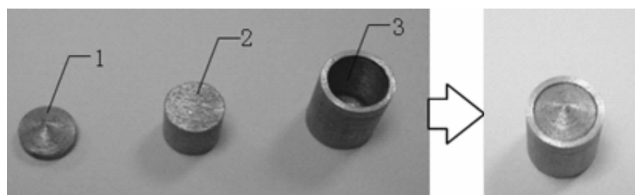
Selective Nitration of Toluene at Presence of New Acidic Ionic Liquids Catalysts

LIU Li-rong, ZHI Hui-zhen, LUO Jun, Lü Chun-xu
Chinese Journal of Energetic Materials, 2009, 17(6): 717 – 721

Catalytic activities of new acidic ionic liquids for nitration of toluene were studied. $\text{HNIL} \cdot \text{NO}_3^-$ and $\text{HNIL} \cdot \text{HSO}_4^-$. The *o/p* (ratio of ortho to para isomer of toluene nitration) ratio is 1.12 in product distribution of toluene nitration. It is lower than 1.67 using sulfonitric acid as catalyst. The yield of products is 99.4%. The catalyst can be reutilized up to five times with little decrease in activity.

Compound Reactive Fragment Penetrating Steel Target

SHUAI Jun-feng, JIANG Jian-wei, WANG Shu-you,
MENG Jian-bing, XIE Chang-you
Chinese Journal of Energetic Materials, 2009, 17(6): 722 – 725



Phenomenon of chemical energy release contains burning and explosion are obvious while reactive fragments penetrate target. Comparing with inert fragments, reactive fragments have a better damage effect.

Heat Loss Correction in Closed Bomb Tests

ZHAO Jun, LIAO Xin, WANG Ze-shan

Chinese Journal of Energetic Materials, 2009, 17(6): 726–730

A new unsteady one-dimensional semi-infinite heat transfer model was established for correcting the heat loss in closed bomb tests. The model comprises a heat flux equation which considering the rapid change of pressure.

Review on Multifunctional Energetic Structural Materials

ZHANG Xian-feng, ZHAO Xiao-ning

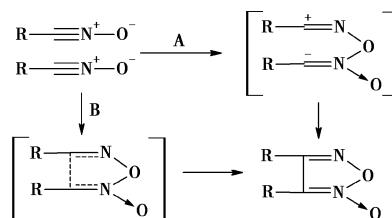
Chinese Journal of Energetic Materials, 2009, 17(6): 731–739

The recent development of multifunctional energetic structural materials (MESM) and its application were introduced. The experimental techniques of MESM under shock load, mechanisms of reaction, and theoretical model were reviewed. The application of shock induced chemical reactions (SICR) model and empirical molecular dynamics methods which were used to describe the reaction process of MESM were introduced. The current application and the prospects of MESM were reviewed.

Dimerization Reaction of Cyanide Oxide: Important Route for Synthesis of Furoxan Derivatives

LI Ya-nan, SHU Yuan-jie, ZHANG Zhi-zhong

Chinese Journal of Energetic Materials, 2009, 17(6): 740–744



Common methods of furoxan ring formation were analyzed. Main preparation reactions of cyanide oxide were summarized. Dimerization reaction of cyanide oxide leads to formation the furoxan derivatives with symmetrical substituent groups.

Review on Synthesis of BAMO Homopolymer and Copolymers

GE Zhen, LUO Yun-jun, GUO Kai, Lü Yong, JIU Yong-bin

Chinese Journal of Energetic Materials, 2009, 17(6): 745–750

The research development of synthesis and properties of 3,3-diazidomethyl-oxetane (BAMO) monomer, homopolymer and copolymers was reviewed.

Synthesis of Aromatic Alkyol and Fluorescence Quenching with TNT

LIU Yong, XIONG Ying, SHU Yuan-jie, LIU Xue-yong, ZHONG Fa-chun, ZHANG Yong, SUN Yi

Chinese Journal of Energetic Materials, 2009, 17(6): 751–752

9-Hydroxy-9-acetenylanthrone was synthesized and characterized, and its fluorescence quenching with TNT in chloroform was investigated.

Recrystallization of 1,3,5-Triamino-2,4,6-trinitrobenzene in Ionic Liquids

MENG Zi-hui, YANG Feng-min, LI Qing-xia, ZHOU Zhi-ming

Chinese Journal of Energetic Materials, 2009, 17(6): 753–754

Recrystallization of 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) in ionic liquids, including 3-ethyl-1-methylimidazolium tetrafluoroborate, 3-butyl-1-methylimidazolium tetrafluoroborate, 3-butyl-1-methylimidazolium hexafluorophosphorus, 3-hexyl-1-methylimidazolium bromine and 3-butyl-1-methylimidazolium chloride was investigated.