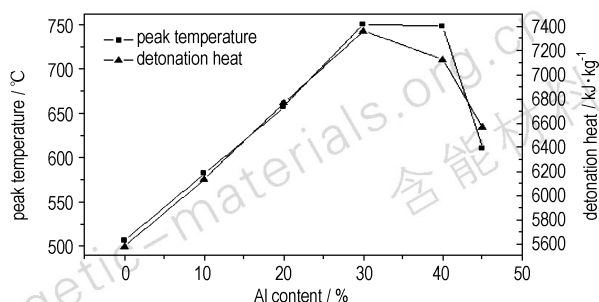


Experimental Study on Blasting Temperature of Al-HMX Compound Explosive

LI Yuan-yuan, WANG Jian-ling, XU Hong-tao
Chinese Journal of Energetic Materials, 2008, 16(3): 241–243



The blasting temperature of Al-HMX compound explosive under enclosed condition was directly measured to investigate the response characteristics and rule of the explosive detonation. Results show that the blasting temperature increases with the increasing of Al content.

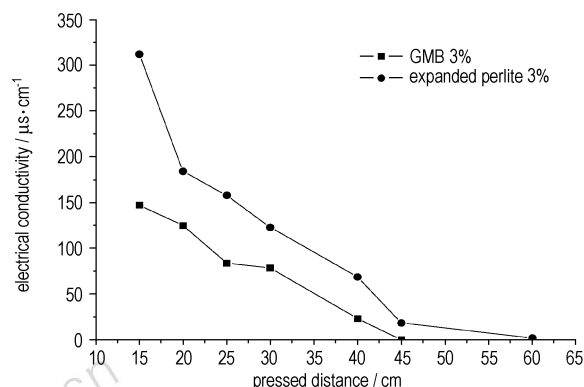
HMX-based Low-sensitive High Explosives Containing DAAzF

LI Yu-bin, HUANG Hui, LI Jin-shan, LI Hong-zhen
Chinese Journal of Energetic Materials, 2008, 16(3): 244–246

Low-sensitive high energetic formulations based on HMX were designed by using diaminoazofurazan (DAAzF) as additive. The safety, heat resistance stability and detonation property of formulations were studied by sensitivity test, gap test, DSC, VST and plate dent test. Results show that addition of the fine DAAzF decrease the sensitivity of HMX.

Effect of Sensitizing Agent on Demulsification Degree of Emulsion Explosive under Dynamic Pressure

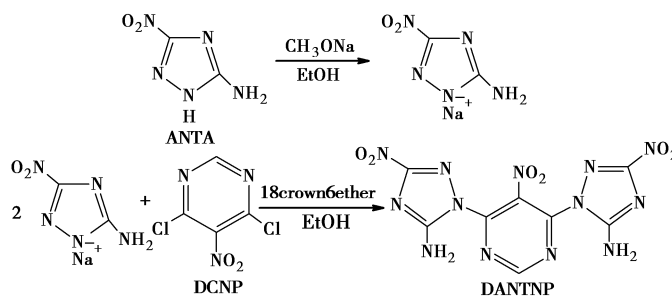
WU Hong-bo, YAN Shi-long, LIU Feng
Chinese Journal of Energetic Materials, 2008, 16(3): 247–250



Based on electrical conductivity curves, the effects of glass micro-balloon (GMB) and expanded perlite with different contents on demulsification degree of emulsion explosive under dynamic pressure were studied. The investigation provides reference to understand desensitization mechanism of emulsion explosive and obtain optimal content of sensitizing agent.

Improvement of the Synthetic Process of 4,6-Bis-(5-amino-3-nitro-1,2,4-triazol-1-yl)-5-nitropyrimidine

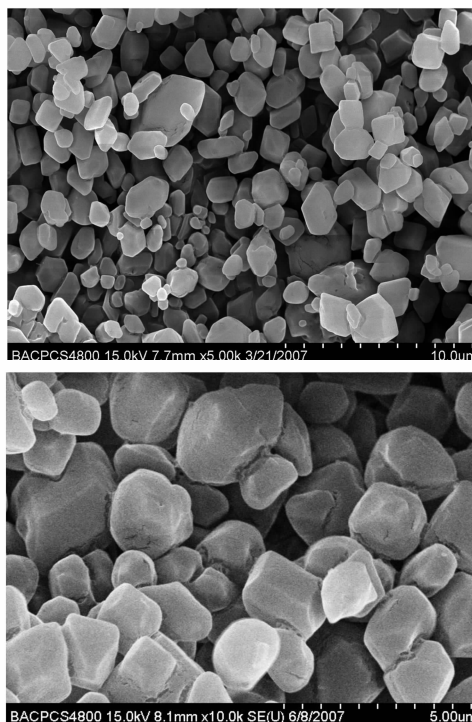
JIA Si-yuan, WANG Xi-jie, WANG Bo-zhou,
 ZHANG Hai-hao, XIONG Cun-liang
Chinese Journal of Energetic Materials, 2008, 16(3): 251–253



4,6-Bis-(5-amino-3-nitro-1,2,4-triazol-1-yl)-5-nitropyrimidine (DANTNP) was synthesized and its structure was confirmed by IR, ¹HNMR, ¹³CNMR and EI.

Morphology Controlling Technique for Submicron CL-20

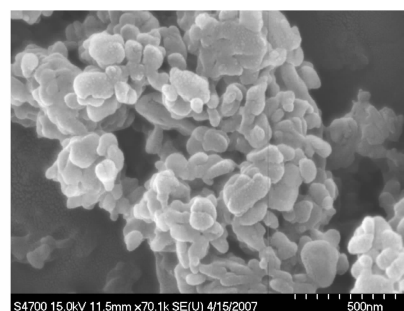
YANG Li, WANG Shao-zong, ZHAO Peng-juan,
ZHANG Tong-lai
Chinese Journal of Energetic Materials, 2008, 16(3): 254–257



The submicron CL-20 was prepared by solvent and anti-solvent methods with different surfactants. Two-gram raw material CL-20 was fined with 3.5 mL 2% PV, the least diameter of CL-20 samples were about 1 μm with uniform and block-like. The particles prepared by watering pot injecting method with 6.5 mL 5% TV were about 1 μm with ellipsoid, uniform and narrow particle-size distribution.

Preparation and Characterization of High Purity Nano HNS

WANG Jing-yu, HUANG Hao, WANG Pei-yong,
CHEN Jian, LIU Hong-ni
Chinese Journal of Energetic Materials, 2008, 16(3): 258–261



Nano-HNS with purity of 99.4% was prepared by combination of solution quench recrystallization and solvent-antisolvent recrystallization. The sensitivities of nano-HNS to impact and short impulse shock wave stimuli were also measured.

Experimental Study on Emulsion Explosive Made by Loading Machine

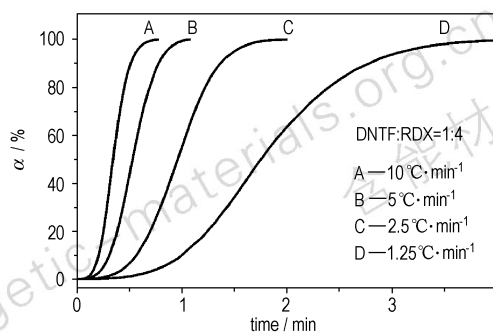
YE Tu-qiang, ZHENG Bing-xu, WANG Xu-guang,
WU Chun-ping
Chinese Journal of Energetic Materials, 2008, 16(3): 262–266

According to the current problems in manufacturing emulsion explosive by using loading machine, the effect of sensitization agent, foaming time and temperature on density and the effect of temperature on the transporting pressure of the pipeline were studied.

Kinetics of Non-isothermal Crystallizations of DNTF, TNT and DNTF-TNT Eutectic System Crystallization in RDX

ZHOU Wen-jing, ZHANG Gao, LIU Zi-ru

Chinese Journal of Energetic Materials, 2008, 16(3) : 267 – 271

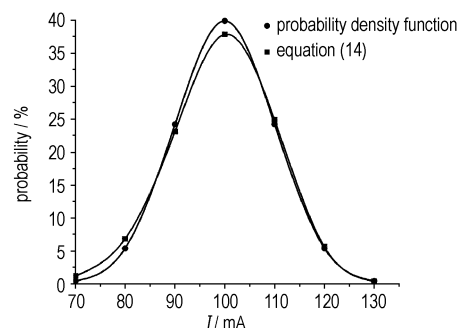


The non-isothermal crystallization of DNTF, TNT and DNTF-TNT eutectic system in RDX was studied by DSC. The various kinetics models were used to investigate the crystallization behavior of DNTF, TNT and DNTF-TNT eutectic system.

Probability Distribution of Current Sensitivity of Energetic Materials

WANG Peng, DU Zhi-ming

Chinese Journal of Energetic Materials, 2008, 16(3) : 272 – 276



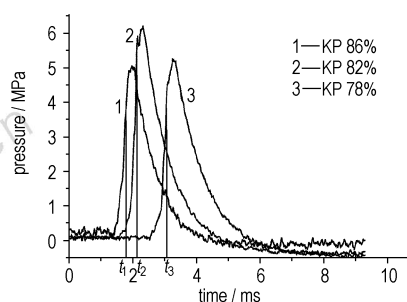
The current sensitivity probability density function of energetic materials was worked out. And the calculation method of current fire reliability of energetic materials was worked out too.

Design and Performance of Nitramine Pyrotechnics Composition

JIANG Xin-guang, LI Guo-xin, WANG Zhi-xin,

LAO Yun-liang

Chinese Journal of Energetic Materials, 2008, 16(3) : 277 – 279



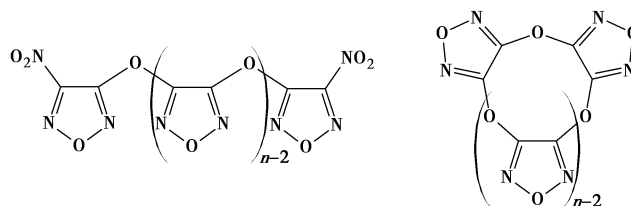
The ignition delayed time for three nitramine pyrotechnics formulations were obtained by measuring the $p-t$ curves.

Predicting on the Detonation Performances of Poly-furazans with Oxy Bridges

GE Zhong-xue, LAI Wei-peng, LIAN Peng,

WANG Bo-zhou, XUE Yong-qiang

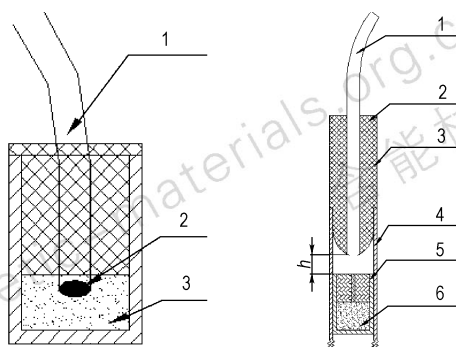
Chinese Journal of Energetic Materials, 2008, 16(3) : 280 – 284



Poly-furazans on a chain ($C_{2n}N_{2n+2}O_{2n+3}$) ($n = 2 - 7$) and on a circle ($C_{2n}N_{2n}O_{2n}$) ($n = 2 - 4, 6$) were optimized at B3LYP/6-31G level. And the relationship between detonation properties and n of two systems were studied respectively. The properties of the two systems were compared when n was equal.

Research on the Performance of PETN and RDX as the Excitation Powder

MA Hong-hao, SHEN Zhao-wu, CHEN Wen-chuan,
ZHOU Guang-hui, FANG Jin-xiong
Chinese Journal of Energetic Materials, 2008, 16(3): 285–289



PETN and RDX can be used as the excitation powder in non-primary detonator. Due to the different properties between PETN and RDX, the delay time was dissimilated. Experiments of the instantaneous electric non-primary detonator and the delay non-electric one were done. The reasons for the difference of the delay time were given.

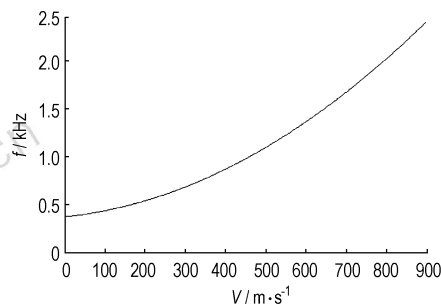
Differential and Integral Isoconversional Non-linear Methods and their Application in Physical Chemistry Study of Energetic Materials V. Theory and Numerical Method Based on Kooij's Formula

HU Rong-zu, ZHAO Feng-qi, GAO Hong-xu, ZHANG Hai,
ZHAO Hong-an, MA Hai-xia
Chinese Journal of Energetic Materials, 2008, 16(3): 290–294

Differential and isoconversional non-linear equations based on Kooij's formula and numerical methods for computing the apparent activation energy (E_a) from isothermal and non-isothermal data were presented.

Effect of NATO Angle and Plate Velocity on Disturbance Frequency of Reactive Armor against Shaped Charge Jet

LI Ru-jiang, SHEN Zhao-wu
Chinese Journal of Energetic Materials, 2008, 16(3): 295–297



A physical model was presented to calculate the disturbance frequency between ERA and shaped charge jet.

Safety of Pyrotechnics with Modified Potassium Chlorate

QIAN Xin-ming, WANG Peng-fei
Chinese Journal of Energetic Materials, 2008, 16(3): 298–300

The thermal properties, friction and impact sensitivities of the pyrotechnics with modified and unmodified potassium chlorate (KClO_3) were tested and compared by adiabatic test, friction and impact sensitivity test. Results show that, compared with unmodified, initial exothermic temperature of pyrotechnics with modified KClO_3 increases $36.08\text{ }^\circ\text{C}$, and the time to maximum rate prolongs more than 6 times, and its maximal pressure produced by unit mass, adiabatic temperature, friction sensitivity, impact sensitivity decreases 0.63 MPa , $95.99\text{ }^\circ\text{C}$, 64% , 72% , respectively.

Synthesis and Characterization of Novel Poly (ϵ -CL)-block-HTPB-block-poly(ϵ -CL) Triblock Copolymer

CHAI Chun-peng, LUO Yun-jun, GUO Su-fang,
LI Guo-ping, CHEN He

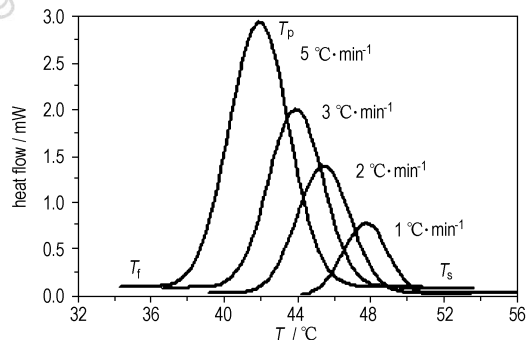
Chinese Journal of Energetic Materials, 2008, 16(3): 301–304

The novel triblock copolymer poly (ϵ -caprolactone)-b-polybutadiene-b-poly (ϵ -caprolactone) (HTBCP) was synthesized via the ring-opening polymerization of ϵ -caprolactone (ϵ -CL) in the initiator of a hydroxyl-terminated polybutadiene (HTPB), and catalyzed by stannous octanoate [$\text{Sn}(\text{Oct})_2$]. The copolymers with different molecular weight were prepared by varying the feed ratio of HTPB to ϵ -CL in the same HTPB molecular weight. The block copolymers were characterized by GPC, FTIR, $^1\text{H NMR}$, TG and DSC.

Non-isothermal Crystallization Kinetics of Polyethylene Glycol

DANG Yong-zhan, ZHAO Feng-qi, GAO Hong-xu,
HU Rong-zu, KANG Bing

Chinese Journal of Energetic Materials, 2008, 16(3): 305–308

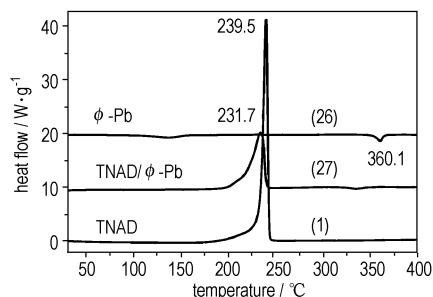


The crystallization kinetic behavior of PEG was studied by the non-isothermal DSC method.

Compatibility of Trans-1,4,5,8-tetranitro-1,4,5,8-tetraazadacalin (TNAD) with Some Propellant Components Evaluated by DSC Method

YAN Qi-long, LI Xiao-jiang, LIAO Lin-quan,
ZHANG Xiao-hong, LIU Zi-ru

Chinese Journal of Energetic Materials, 2008, 16(3): 309–314

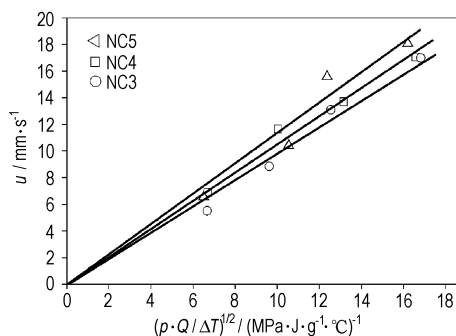


The compatibility of trans-1,4,5,8-tetranitro-1,4,5,8-tetraazadacalin (TNAD) with some energetic components and inert materials of solid propellants was studied by using the DSC method. And according to the values of ΔT_p , the compatibility of TNAD with other materials can be judged.

Relationship between the Characteristic Value of PDSC and Burning Rate of NEPE Propellant Containing CL-20

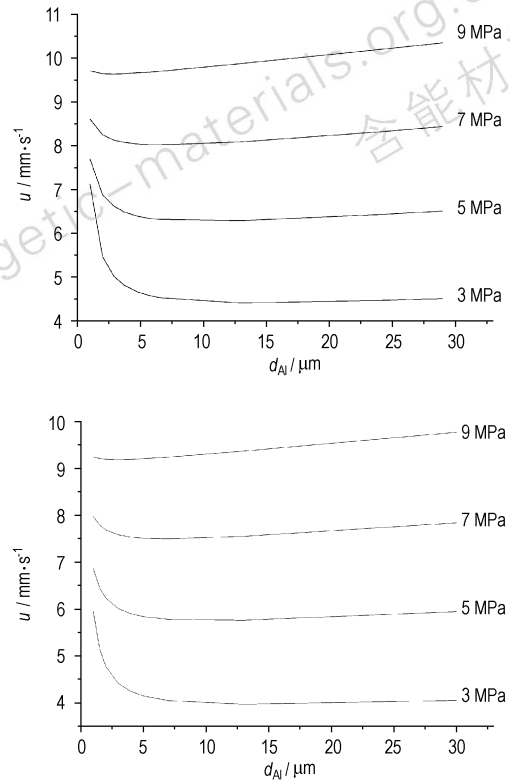
DING Li, ZHAO Feng-qi, LIU Zi-ru,
ZHANG La-ying, HENG Shu-yun

Chinese Journal of Energetic Materials, 2008, 16(3): 315–318



The linear equation expressing burning rate of NEPE propellant containing CL-20 by characteristic value of DSC was derived. k_r , correlation factor of burning rate with PDSC characteristic value was given. k_r can be used to study the effect of burning catalysts on burning rate of CL-20-NEPE propellant.

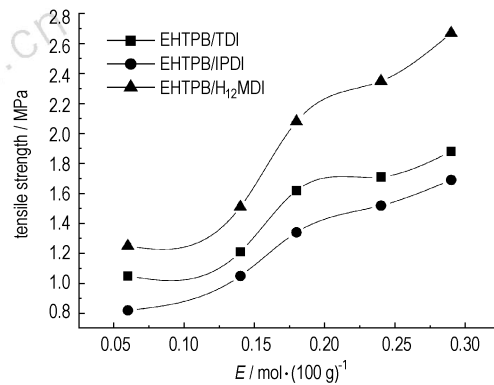
Modeling Effects of Aluminum Content and Particle Size on NEPE Combustion Performance



LI Miao-miao, SONG Hong-chang, WANG Yue,
CHENG Zhi-peng, GUO Xiao-de
Chinese Journal of Energetic Materials, 2008, 16(3): 319–322

A numerical model for simulating the burning rate and pressure of NEPE propellant was developed based on the chemical structure of component and thermal behavior and combustion characteristic.

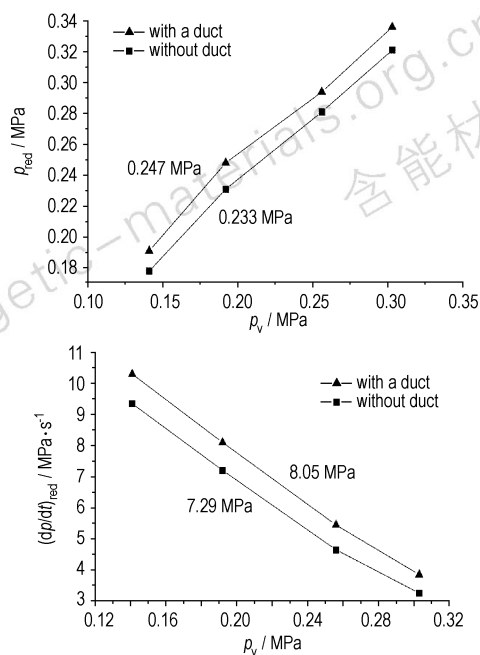
Mechanical Properties of Modified Hydroxyl-Terminated Polybutadiene Based Polyurethane



SUN Jie, ZHENG Yuan-suo, GAO Guo-xin,
WANG Lei, TAN Yi-bo
Chinese Journal of Energetic Materials, 2008, 16(3): 323–326

EHTPB with different epoxide numbers prepared by peroxide acetic acid in situ were cured with TDI, IPDI and H_{12} MDI. The results show H_{12} MDI is a better solidified agent for mechanical properties. The optimal epoxide number of EHTPB is about $0.18\text{ mol}\cdot(100\text{g})^{-1}$.

Effects of Vent Duct on Explosion Venting Characteristics of Dust in the Vessel

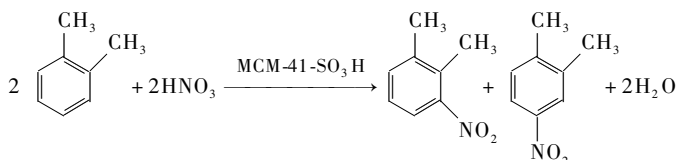


The effect of vent duct on explosion venting characteristic of aluminum dust was studied. Compared with no duct, the maximum reduced pressure and the maximum rate of pressure rise obtained at condition of vessel connected to a duct is higher. Moreover, vent duct size is also an important factor to study of explosion venting characteristic of dust.

YU Jian-liang, Lü Ming-yu

Chinese Journal of Energetic Materials, 2008, 16(3): 327–332

Nitration of *o*-Xylene by Regioselective Catalysis with SO₃H Group Supported on Mesoporous Molecular Sieve



MCM-41-SO₃H was prepared by direct-synthesis methods. 3,4-Dimethylnitrobenzene was synthesized by regioselective nitration from *o*-xylene and nitric acid used MCM-41-SO₃H as solid super-acid catalyst.

XI Li-min

Chinese Journal of Energetic Materials, 2008, 16(3): 333–336

Fluorous Biphasic System and Nitration of Toluene

Perfluorous nonane (PFN) or perfluorous hexane (PFH) formed fluorous biphasic system (FBS) with some organic solvents. Toluene nitration at equivalent molar ratio of toluene and 95% HNO₃ catalyzed by little H₂SO₄ in FBS was investigated. The yield and ratio of *p*-nitrotoluene to *o*-nitrotoluene ($R_{p/o}$) are affected by nitration system, reaction time and temperature, quantity of PFN or PFH used. The perfluorous solvents were recovered by simple phase separation and could be reused. Toluene nitration in fluorous biphasic system is a green synthesis method.

LI Rui-jun, SHI Hong-xin, ZHU Jian-ping,
LIU Qiu-ping, XU Jian-guo

Chinese Journal of Energetic Materials, 2008, 16(3): 337–340

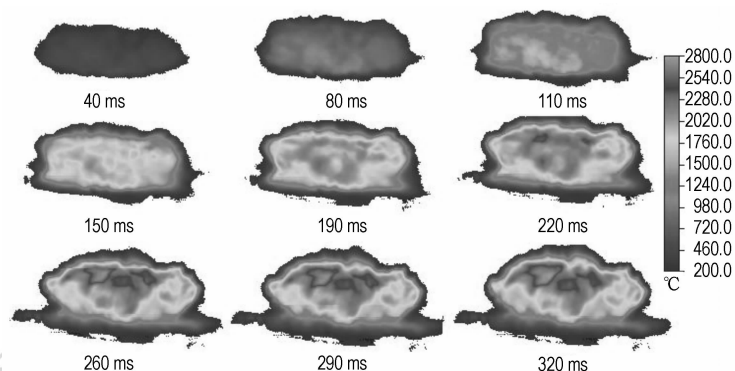
Selective Nitration of Toluene at the Presence of Silicotungstic Acid Catalyst

Silicotungstic acid catalyst shows high selectivity in toluene nitration. The catalyst could be reused up to five times with little decrease in activity.

LIU Li-rong, Lü Chun-xu, ZHANG Xiao-bo

Chinese Journal of Energetic Materials, 2008, 16(3): 341–343

Application of Infrared Thermo-imaging Technology in Temperature Measurement of Cloud Explosion



LI Xiu-li, HUI Jun-ming, XIE Li-feng

Chinese Journal of Energetic Materials, 2008, 16(3): 344–348

The fireball temperature distribution characteristic of cloud explosion was studied by infrared thermo-imaging technology.

Review on HTPE Propellants

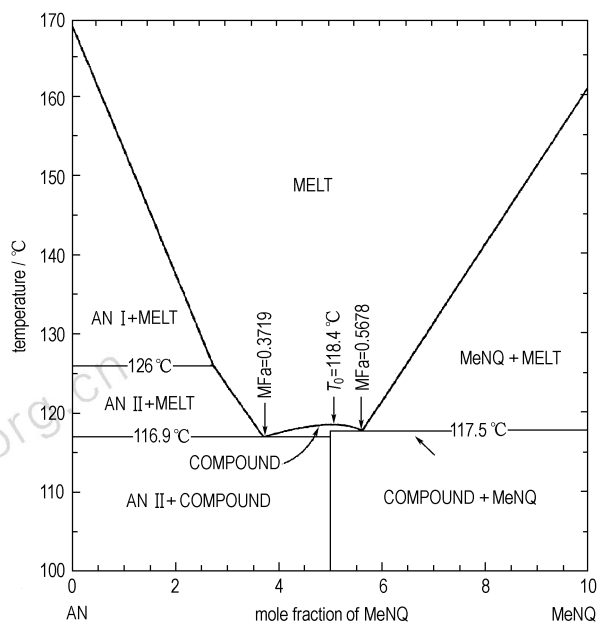
SONG Xiao-qing, ZHOU Ji-yi, WANG Wen-hao,

LI Xin-hao

Chinese Journal of Energetic Materials, 2008, 16(3): 349–352

Review on the development and production of HTPE binders, comparison between HTPE and HTPB, aging of HTPE propellants and improving on insensitive property of HTPE propellants was given. It is shown that HTPE propellants can be used as an alternative to HTPB propellants due to its remarkable insensitive property and perfect mechanical properties.

Synthesis Progress and Application of *N*-Methyl-*N'*-nitroguanidine in Melt/Cast Explosives



ZHANG Guang-quan, DONG Hai-shan

Chinese Journal of Energetic Materials, 2008, 16(3): 353–355

N-Methyl-*N'*-nitroguanidine (MeNQ) and ammonium nitrate (AN) can consist a eutectic mixture, which could be formulated to a series of melt/cast intermolecular explosives.

Piperazine Chemistry Part I Developments on Synthesis of High Energy Density Compound of Piperazine Series

LIU Yu-zhu, YU Zhi-yu, YU Jiang-yong

Chinese Journal of Energetic Materials, 2008, 16(3): 356–360

The synthetic research and development of diformyltetrahydroxypiperazine (DFTHP) and its derivatives were reviewed. Both HHTDD and HHTTD are typical representatives of fused ring-nitroamine, TEX is a typical representative of cage nitroamines.