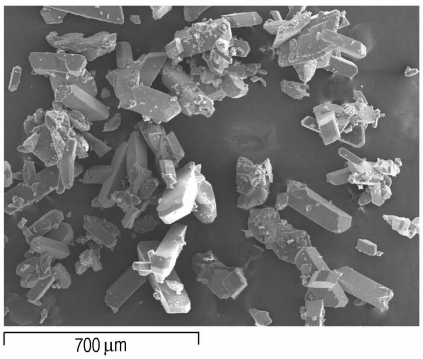
Synthesis and Properties of New Initiating Explosive DACP

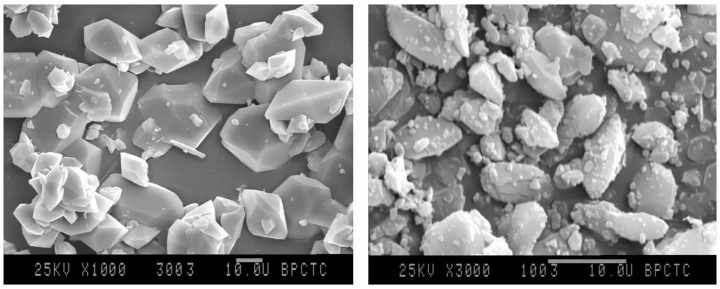


Tetraamminediazido cobalt (Ⅲ) perchlorate (DACP) was synthesized from tetraamminecarbonato cobalt (Ⅲ) nitrate (CTCN), sodium azide and perchloric acid. The structure of title compound was characterized by the IR, ^{1}H NMR etc. The properties of this compound were also discussed. The test results show that DACP is an excellent primary explosive. In some initiating devices, DACP is a substitute for tetraamminebis (5-nitrotetrazolato) cobalt (Ⅲ) perchlorate (BNCP) and Pb$(N_3)_2$. And synthetic method of DACP is much simpler than that of BNCP.

SHENG Di-lun, MA Feng-e

Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **161 – 164**

Synthesis and Properties of HNIW

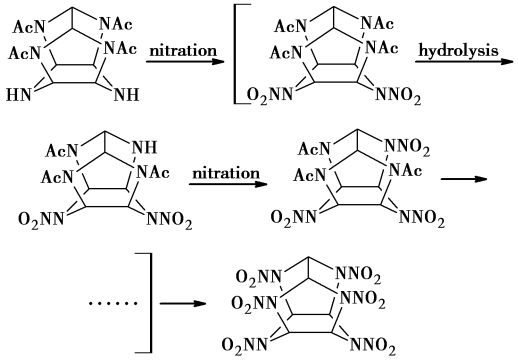


ε-HNIW was prepared by nitrolysis of two chemicals tetraacetyldiformylhexazaisowurzetane (TADFIW) and tetraacetyldibenzylhexazaisowurzetane (TADBIW) respectively. Thermal decomposition parameters and impact sensitivity (H_{50}) of the two kinds of HNIW samples were determined and SEM pictures were given.

JIN Shao-hua, ZHAI Mi-cheng, LIU Jin-quan,
ZHENG Chuan-ming, CHEN Shu-sen, SONG Quan-cai

Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **165 – 167**

Hydrolysis and Nitration Reaction of Tetraacetylhexaazaisowurzitane

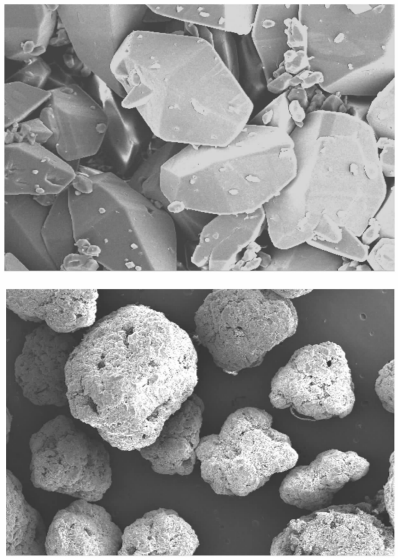


The hydrolysis and nitration of tetraacetyl-hexaazaisowurzitane was studied under several nitration conditions, and also a new method was found out to synthesize hexanitrohexa-azaisowurtzitane.

XIONG Ying-jie, CHEN Shu-sen, JIN Shao-hua,
SHI Yan-shan

Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **168 – 170**

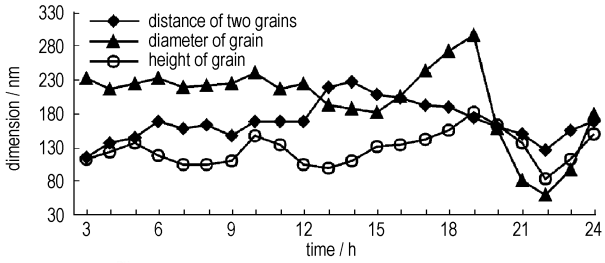
The Coating and Desensitization of CL-20



The uncoated and coated crystals of CL-20 can be found in the photos of scanning electron microscope. It can be found that the coated CL-20 crystals have smooth particles and the sharp edges of the crystals are immerged; furthermore, the sensitivity of the explosive is obviously decreased when the explosive is coated with graphite.

CHEN Lu-ying, ZHAO Sheng-xiang, YANG Pei-jin,
HENG Shu-yun, LI Wei, HUANG Xiao-wu
Chinese Journal of Energetic Materials,2006,14(3): 171 – 173

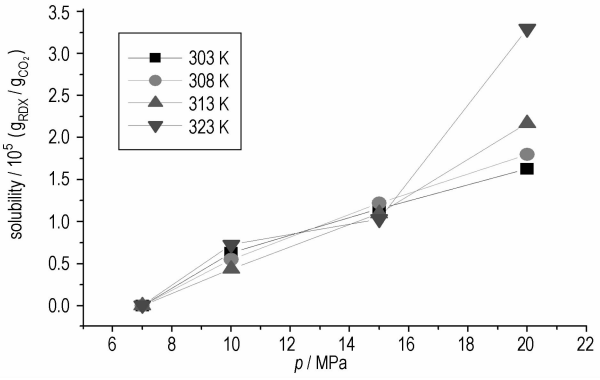
In-situ AFM Analysis on Thermal Stage for TATB/AU Films



Micro-zone morphologic and phase changes of TATB/AU films were studied in situ with AFM on a thermal stage in long-duration. Nonlinear expansion is observed, and the cut-throat shape variation of adhesive (AU) accelerates the cleavage of TATB crystal fine grains.

GUAN De-bin, CHENG Ke-mei, ZUO Yu-fen,
ZHOU Jian-hua
Chinese Journal of Energetic Materials,2006,14(3): 174 – 177

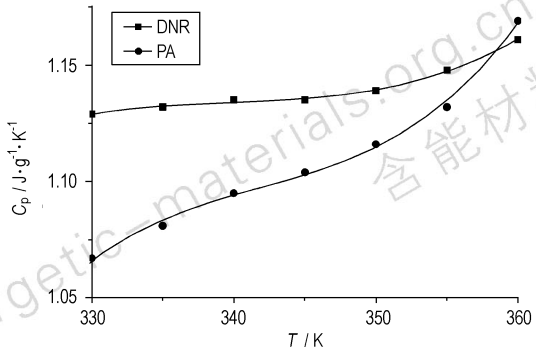
RDX's Solubility in Supercritical Carbon Dioxide



The solubility of RDX in supercritical carbon dioxide ($SC\text{-}CO_2$) at 303, 308, 313, 323 K and a pressure range of 7 – 20 MPa were measured.

WEN Li-qun, ZHANG Shu-hai, ZHANG Jin-lin
Chinese Journal of Energetic Materials,2006,14(3): 178 – 180

Determination of Specific Heat Capacity of Energetic Compounds by DSC

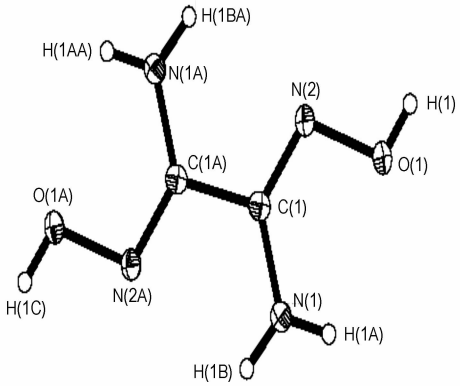


The specific heat capacities of DNP and PA at the temperature range of 330 – 420 K were measured by means of Pyris 1 DSC. The empirical formula of specific heat capacity for DNP was: $-103.5439 + 0.9238T - 0.0027T^2 + 2.6667 \times 10^{-6} T^3$; for PA: $-265.8844 + 2.3394T - 0.0068T^2 + 6.6667 \times 10^{-6} T^3$).

SUN Cui-na, QIAO Xiao-jing, ZHANG Tong-lai, ZHANG Jian-guo, YU Wen-guang

Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **181 – 183**

Preparation, Crystal Structure and Thermal Behavior of Diaminoglyoxime

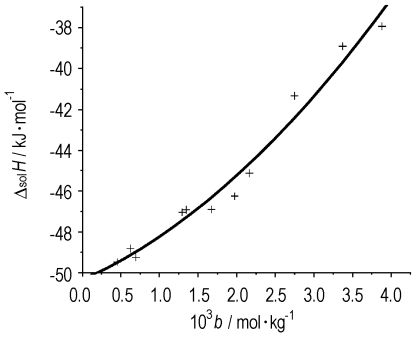


The single crystal of diaminoglyoxime (DAG) was characterized by X-ray single crystal diffraction and FTIR. The thermal behavior of DAG in a temperature-programmed mode was investigated by means of DSC and TG-DTG techniques.

HE Wei, ZHANG Tong-lai, ZHANG Jian-guo, YU Wei, GUO Jin-yu

Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **184 – 187**

Enthalpies of Dissolution of $[Mn(SCZ)_3](PA)_2 \cdot H_2O$ in DMF

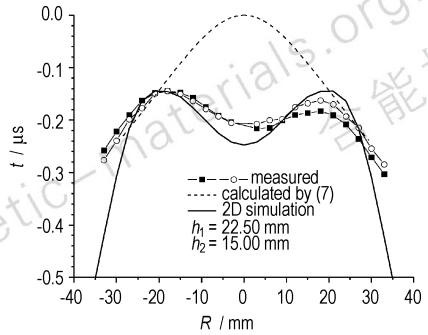


The enthalpy of dissolution of $[Mn(SCZ)_3](PA)_2 \cdot H_2O$ in DMF at 298.15 K was measured by means of a SETARAM C80 Ⅱ calorimeter and the empirical formula describing the $\Delta_{diss}H$ vs b relationship ($\Delta_{diss}H = -43.61 - 454.98b + 9378.2b^{1/2}$) was obtained.

PEI Qin, YANG Li, ZHANG Tong-lai, ZHANG Jian-guo, SUN Yuan-hua, SHAO Feng-lei

Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **188 – 190**

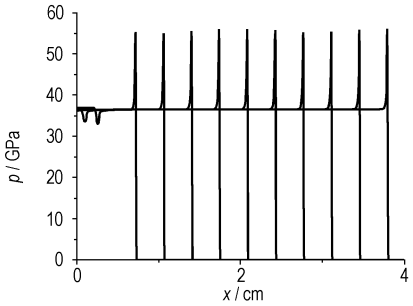
Manufacture of Low Equivalent Liquid Explosive Lens without Lead



LI Sai-nan, ZHOU Xian-ming, YUAN Suai,
SONG Ping, WANG Wei, YEI Su-hua
Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **191 – 194**

By using Teflon as the rectification plate, a kind of low equivalent liquid explosive lens with nitromethane was designed. The experimental results show that strong detonation is reduced by decreasing the thickness of booster pellet.

Numerical Simulation of Detonation in Condensed Explosives by Using an Improved Eulerian Method



ZHANG Bo, YU Ming
Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **195 – 199**

An improved Eulerian method is constructed to predict the key characteristic of initiation and propagation of detonation, such as Von Neumann spike pressure and reaction zone width.

Study on Ramp Current Method and Up-and-down Method for Sensitivity Testing of Initiating Device

BAI Ying-wei, JIANG Zhuang-de, ZHAO Yu-long,
CHU En-yi
Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **200 – 204**

A ramp input signal was utilized to an electrical explosive device to provide an accurate potential at which it fires. In order to assure the ramp current was under the control exactly, only five types of ramp currents were designed in the apparatus and the precision was 0.01 A. The experimental results are regular and ideal at the range of 1 – 3 $A \cdot s^{-1}$, and the testing results change rarely as the charging pressures at that range.

Reliability Estimation of Initiating Devices Based on Sample Maximum Failure Probability

ZHOU Mei-lin, CAI Rui-jiao, HAN Dun-xin
Chinese Journal of Energetic Materials, **2006**, **14**(**3**): **205 – 208**

Based on a new reliability estimation method of go/no-go, an estimation method of confidence with lower limit of the Initiating Devices reliability was proposed. Compared with GO/NO-GO Method of GJB 376 – 87, the estimation method needs a fewer samples for assessing confidence level and high reliability of Initiating Devices.

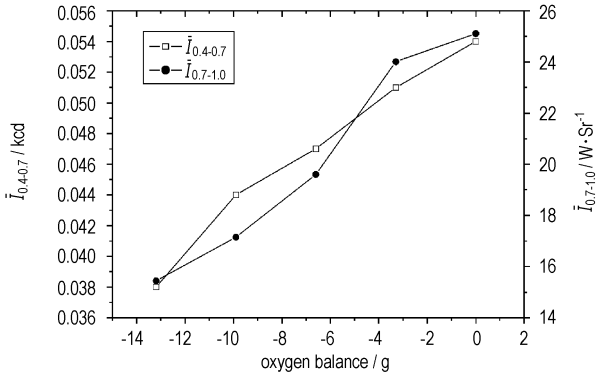
Effect of Smoke Screen's Transmissivity on Laser Homing Guidance

ZHANG Jin-sheng, GAO Zhi-jie, LI Zheng-wei,
WANG Shi-cheng

Chinese Journal of Energetic Materials, 2006, 14(3): 209 – 214

The simulation results of the smoke screen countering laser guided weapon under typical weather environment and different transmissivity (T = 0% – 100%) of 3 bomb release modes were given and the value of smoke screen interference was analyzed quantitatively in battle field. Meanwhile, according to the simulation data, some advices for technical development of the smoke screen were presented.

Influence of Oxygen Balance on Flame Radiation of Infrared Illuminating Composition



CHENG Nian-shou, PAN Gong-pei, GUAN Hua

Chinese Journal of Energetic Materials, 2006, 14(3): 215 – 217

when oxygen is deficient, the burning temperature of illuminating composition increases along with the oxygen balance tending to zero, and radiant intensities of the near-infrared (0.7 – 1.0 μm) and visible light (0.4 – 0.7 μm) are improved at one time, and the extent of near-infrared radiant intensity is much more than that of visible light.

Influence of Gun Propellant on the Penetrability of Powder Loads

TIAN Xin

Chinese Journal of Energetic Materials, 2006, 14(3): 218 – 220

Effect of the related parameters (i. e. bulk density, nitrogen content of NC, explosive shape, grain size) on the penetrability of powder loads was studied.

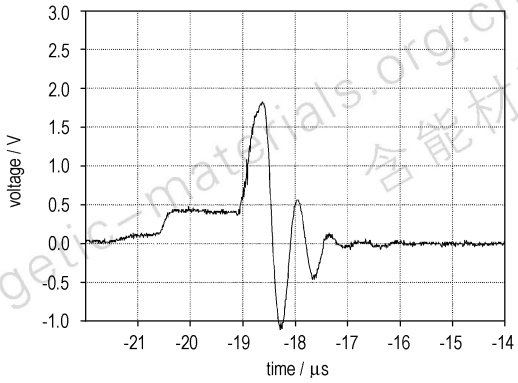
Calculation and Establishment of Interior Ballistics Model for Ejection Gun of Rocket Ejection Seat

ZHAI Zhi-qiang, CAI Rui-jiao, DONG Hai-ping,
MA Jin-gui, WU Yao

Chinese Journal of Energetic Materials, 2006, 14(3): 221 – 223

The physical and mathematical models of interior ballistics of ejection gun were established and validated by test. The measured curves are consistent with the calculation results and the largest errors of their characteristic parameters are less than 3%, which demonstrate that the model is correct and effective.

Characteristics of Detonator Sympathetic Explosion in Densified Medium

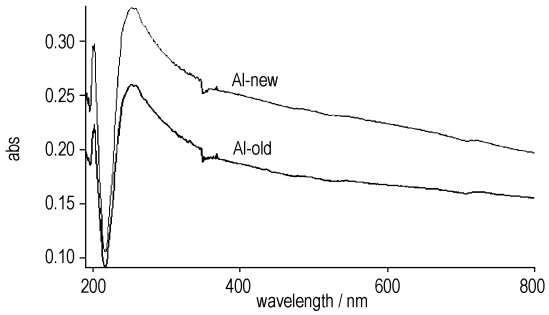


ZHAO Yao-hui, JIAO Qing-jie, ZANG Chong-guang, LIU Shuai

Chinese Journal of Energetic Materials, 2006, 14(3): 224 – 226

Sympathetic explosion of detonators in chipboard was analyzed with recorded waveforms. The shock wave pressure peak and its duration were recorded.

Characterization of Structure and Properties of Al Nanoparticles



CHU Guang, TANG Yong-jian, CHU Shi-jin, WEI Jian-jun, LI Chao-yang, LIU Wei

Chinese Journal of Energetic Materials, 2006, 14(3): 227 – 230

Al nanoparticles were prepared by flow-levitation method. The morphologies, granularities, structure and properties of particles were investigated by EDAX, XRD, UV-visible absorption spectroscopy and thermal analysis (DSC-TG) techniques.

Computational Analysis on Parameters of Shaped Charge Affecting Formation of Jetting Projectile by Numerical Simulation and Grey Relation Theory

ZHAO Hui-ying, SHEN Zhao-wu, WANG Xiao-hai

Chinese Journal of Energetic Materials, 2006, 14(3): 231 – 235

Grey relation theory was applied to analyze the simulation results. The grey relational matrix shows that altitude of the liner is the main factors affecting the performance of the shaped charge.

Application Study on Blasting with Linear Cumulative Cutting Charge in Rock

LUO Yong, SHEN Zhao-wu, CUI Xiao-rong

Chinese Journal of Energetic Materials, 2006, 14(3): 236 – 240

The mechanism of crack initiation and its expansion of orientation fracture blasting by linear cumulative cutting charge in rock was studied, then the cumulative cutting charge was designed and tested in laboratory and field.

Executive editor: LI Shao-hui; Computer typesetter: ZHANG Gui-hong