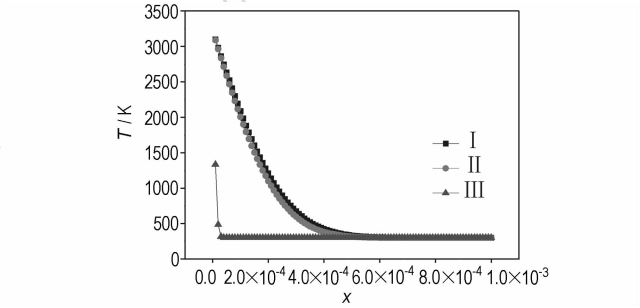
Some Issues on Discipline Construction of Ordnance Science and Technology

XU Yi-da

Chinese Journal of Energetic Materials,**2011**,**19**(**1**): **1 -4**

The discipline construction of ordnance science and technology in China was discussed.

Temperature Response of Aluminum, Thermit and Aluminized Explosive Particles under Thermal Effects in Nitromethane Detonation Region

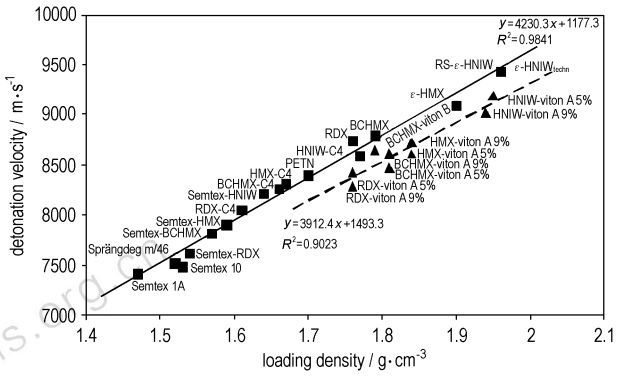


HU Rong-zu, GAO Hong-xu, ZHAO Feng-qi,
XU Si-yu, ZHANG Hai, MA Hai-xia

Chinese Journal of Energetic Materials,**2011**,**19**(**1**): **5 -7**

Under thermal effect in nitromethane detonation region, the diagrams describing the relation between temperature and penetration depth of aluminum, thermit and aluminized explosive particles have been constructed.

Preliminary Study on Several Plastic Bonded Explosives Based on Cyclic Nitramines

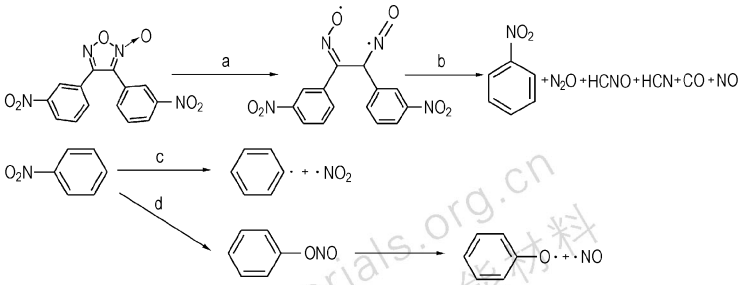


A series of plastic explosives have been prepared with binders based on polyisobutylene (PIB), acrylonitrile-butadiene rubber (ABR), viton A and using four nitramines, namely RDX (1,3,5-trinitro-1,3,5-triazinane), ε-HMX (ε-1,3,5,7-tetranitro-1,3,5,7-tetrazocane), BCHMX(*cis*-1,3,4,6-tetranitro-octahydroimidazo-[4,5-*d*]imidazole) and ε-HNIW (ε-2,4,6,8,10,12-hexanitro-2,4,6,8,10,12-hexaazaisowurtzitane).

Svatopluk Zeman, Ahmed Elbeih, Zbyněk Akštein

Chinese Journal of Energetic Materials,**2011**,**19**(**1**): **8 -12**

Thermal Decomposition Mechanism and Quantum Chemistry Study on 3,4-Bis(3′- nitrophenyl-1′- yl) furoxan

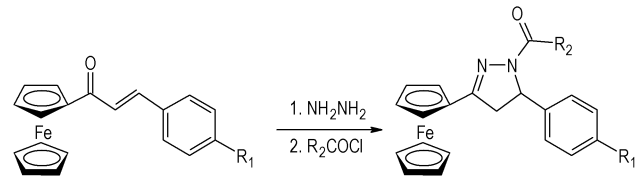


The structure of 3,4-bis(3′-nitrophenyl-1′-yl) furoxan was estimated by a B3LYP method based on 6-31G(d,p) basis set and the stable geometric configuration and bond order were obtained. Thermal decomposition mechanism of 3,4-bis(3′-nitrophenyl-1′-yl) furoxan was studied by means of simultaneous TG-DSC-FITR-MS.

XUE Yun-na, YANG Jian-ming, WANG Xiao-hong, YU Qin-wei, LIAN Peng, LI Ya-ni, LAI Wei-peng, Lü Jian, XUE Yong-qiang

Chinese Journal of Energetic Materials, **2011, 19(1): 13 −18**

Synthesis of Ferrocenyl Dihydropyrazole Derivatives and their Catalysis on Thermal Decomposition of AP



1a,1b **2a,2b,2c**

1a: R_1 = H; **2a**: R_1 = H, R_2 = *p*-pyridine;

1b: R_1 = Br; **2b**: R_1 = Br, R_2 = C_6H_5;

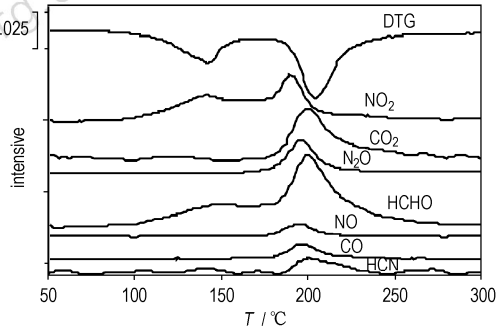
2c: R_1 = Br, R_2 = *p*-pyridine;

Three ferrocenyl nitrogenous heterocyclic compounds containing polar functionalities were designed and synthesized. The thermal decomposition properties of AP with 5% (weight) of the titled compounds were investigated by differential thermalanalysis (DTA) and thermogravimetry (TG).

GAO Yong, KE Chen-feng, LI Heng-dong, XIE Li-li, YUAN Yao-feng

Chinese Journal of Energetic Materials, **2011, 19(1): 19 −22**

Effect of Nano Lead Salt on Catalytic Thermal Decomposition of Double-based Propellants

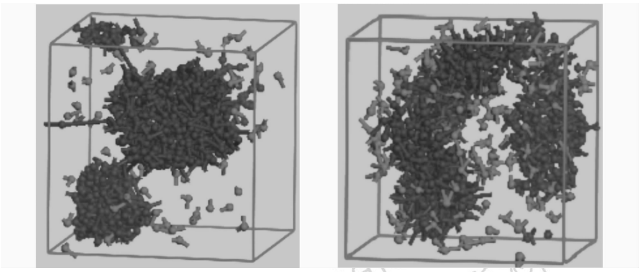


The effects of two nano burning rate catalysts (nano lead 2,4-dihydroxybenzoate and nano lead phthalate) on thermal decomposition of double-based propellants were studied using TG-DSC-IR simultaneous techniques and combined solid reaction cell in-situ and RSFT-IR.

XIE Ming-zhao, FENG Xiao-qiong, HENG Shu-yun, WANG Xiao-hong, CHEN Zhi-qun, PAN Qing, WANG Ming, LIU Zi-ru

Chinese Journal of Energetic Materials, **2011, 19(1): 23 −27**

Simulation on Aggregation Morphology of Gemini Surfactants for Emulsion Explosive in Aqueous Solution

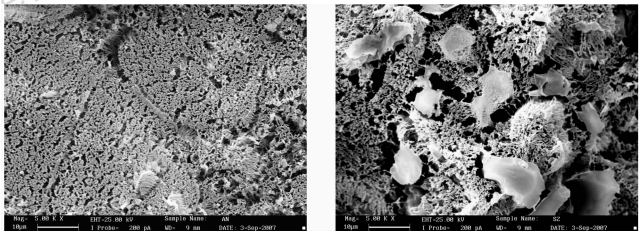


DU Shuan-li, WANG Jing-yu, HE Shuang, ZHU Jia-ping, REN Jun, HU Zhi-yong, CAO Duan-lin

Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **28** −**32**

Aggregation morphology in aqueous solution on Gemini surfactants for emulsion explosive was simulated. The effect of the structure of spacer group on the aggregation morphology of Gemini surfactants was obvious.

Self-sensitizing Characteristics and Detonation Performance of Ammonium Nitrate

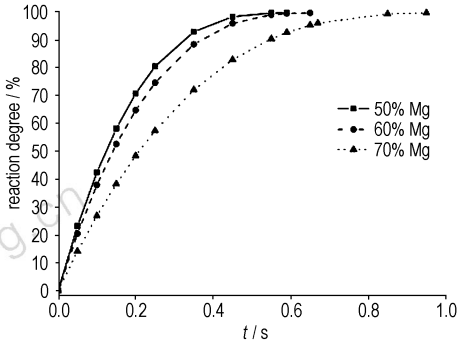


MEI Zhen-hua, ZENG Gui-yu, QIAN Hua, Lü Chun-xu

Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **33** −**36**

The relationships among pore structure characteristics(such as porosity, pore diameter, specific surface area, and pore distribution), self-sensitizing characteristics and detonation performance of ammonium nitrate were investigated.

Effects of Formulation Parameters on Reaction Characteristics of Magnesium-based Hydroreactive Fuel with Water Vapor

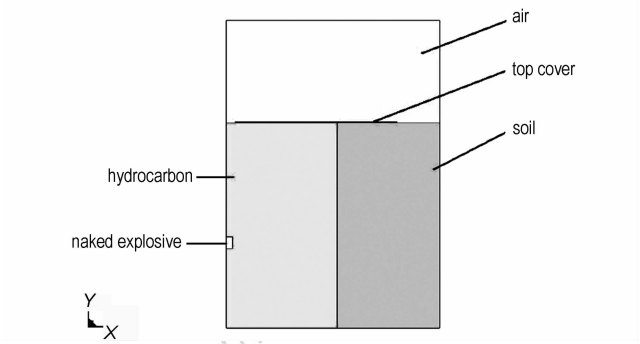


ZHOU Xing, ZHANG Wei, LIU Xian-wei

Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **37** −**41**

The reaction characteristics of magnesium-based hydroreactive fuel with water vapor were investigated. A series of experiments were carried out to study the effects of formulation parameters, such as, the mass ratio of oxidizer to binder, the content of fine magnesium powder, additives, and the content of magnesium powder, on the reaction characteristics of the fuel with vapor.

Experimental Study on Reaction Energy Release Characteristics of Hydrocarbon and Chlorine Trifluoride



GAO Hong-quan, LU Fang-yun, WANG Shao-long,
LUO Yong-feng, YAN Hua, LIU Zhi-yong
Chinese Journal of Energetic Materials,2011,19(1): 42 -45

The explosive of the experiment device in the confined space filled with hydrocarbon was simulated by the equivalent naked TNT, and the velocity of the top cover with the TNT mass was obtained.

Fractal Dimension Calculation on Roughness and Size Distribution of Agglomerated Boron Particles and Its Relationship with Rheological Properties for Fuel-rich Propellant

PANG Wei-qiang, FAN Xue-zhong
Chinese Journal of Energetic Materials,2011,19(1): 46 -49

The fractal dimensions of agglomerated boron particles were calculated. The relationships of roughness and size distribution for agglomerated boron particles with fractal dimension and rheological property of fuel-rich propellant were analyzed, respectively.

Correlation between Alternating Temperature Accelerated Aging and Real World Storage of HTPB Propellant

DING Biao, ZHANG Xu-dong, LIU Zhu-qing, LI Gao-chun
Chinese Journal of Energetic Materials,2011,19(1): 50 -54

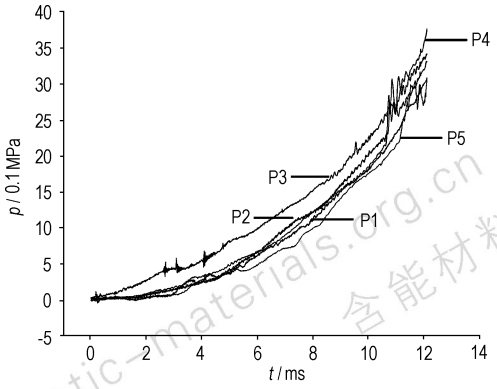
The alternating temperature accelerated aging test was designed. The mechanical properties of aged HTPB propellant under different rates of temperature change was measured and analyzed by means of uniaxial tension. The correlation between accelerated aging and real world storage of HTPB propellant was analyzed in terms of elongation.

Experimental Study on Flame-Spreading of High Energy Propellant

XIAO Bo, LIU Pei-jin
Chinese Journal of Energetic Materials,2011,19(1): 55 -59

The rules in flame-spreading and spreading speed for high energy propellant were investigated in ignition transient of solid rocket motor (SRM) experiment by means of thermocouple target-line method and a optical measurement method.

Experimental Study on Technology of Multi-point Ignition in Long-Chamber Charge

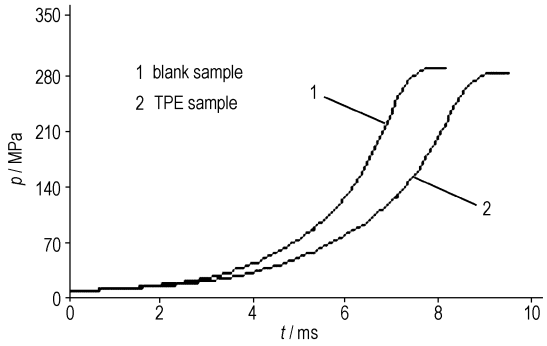


JI Xiao-song, WANG Hao, FENG Guo-zeng

Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **60 -64**

In order to solve the problem of the long chamber charging on large-caliber gum, a multi-point ignition system was designed, the *p*-*t* curves were measured by simulation equipment.

Effect of Thermoplastic Elastomer on Mechanical Properties and Combustion Performance of Nitroamine Propellant

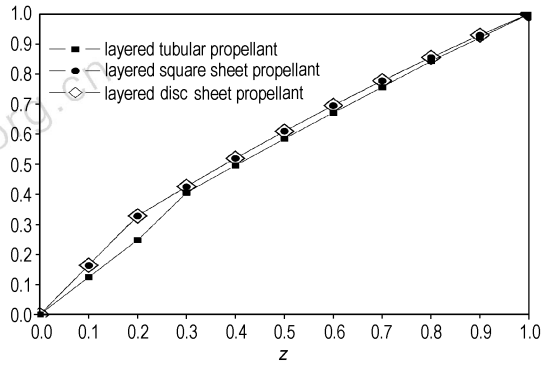


HE Xiao-jun, XU Xia, DU Lan-ping, ZHAO Liang-you, Lü Lin

Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **65 -68**

Mechanical property and static combustion performance of nitroamine propellant containing the thermoplastic elastomer were studied.

Model Effects on Progressive Combustion Property of Layered Propellant

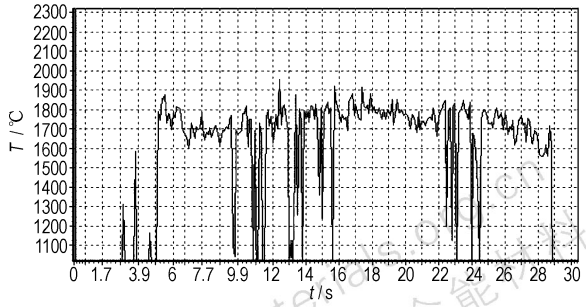


LU Kun, MA Zhong-liang, XIAO Zhong-liang

Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **69 -73**

The combustion quality percentage ψ of multilayered tubular propellant, layered square sheet propellant and layered disc sheet propellant was studied at burned thickness percentage z between 0 and 1.

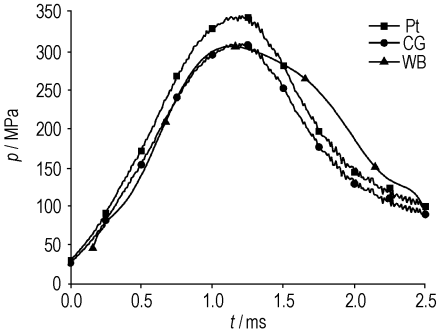
Calculation and Measurement Analysis of Propellant Burning Temperature



LIAO Jing-lin, JIANG Jin-yong, LU Gui-e,
CHANG Wen-ping, ZHAI Hong-chang
Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **74 -77**

The burning temperature of single-based (H100 and H130), SF (SF-3), modified double-based propellants (171-25 and GT) were calculated and measured at constant pressure.

Two Methods to Test Gun Propellant Burning Rate in Gun Chamber



ZHANG Jiang-bo, ZHANG Yu-cheng, LI Qiang,
YAN Wen-rong, YAN Guang-hu, ZHAO Xiao-mei
Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **78 -81**

Burning rules of gun propellant in gun chamber were studied with the microwave interferometer testing and ordinary testing methods, and a relative calculation method was proposed.

IR Screening Characteristics of Doped Exfoliated Graphite

DOU Zheng-wei, LI Xiao-xia, ZHAO Ji-jin
Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **82 -85**

The expandable graphite prepared by chemical oxidizing process was mixed with CuO and Fe_3O_4, respectively, and then expanded at 900 ℃. The expanded volume of the doped EGs were tested, and the IR screening characteristics of the doped EGs were tested by a static screening testing system. Finally, the results of the IR screening efficiencies of doped EGs were analyzed based on their expanded volumes.

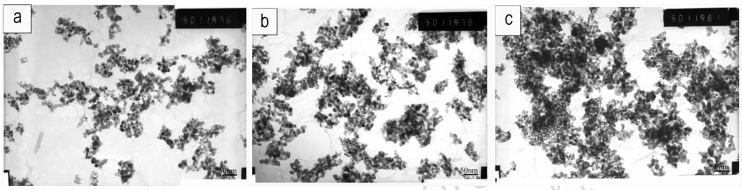
Preparation of Nanometer α-Al_2O_3 Powder by Spray-Precipitation Method

D/nm	*G*(d)	*C*(d)	*D*/nm	*G*(d)	*C*(d)	*D*/nm	*G*(d)	*C*(d)
30.1	0	0	30.8	95	37	31.6	0	100
30.1	0	0	30.9	100	52	31.7	0	100
30.2	0	0	30.9	95	66	31.8	0	100
30.3	0	0	31.0	83	79	31.8	0	100
30.3	0	0	31.1	65	88	31.9	0	100
30.4	0	0	31.1	47	95	32.0	0	100
30.5	0	0	31.2	30	100	32.1	0	100
30.5	0	0	31.3	0	100	32.1	0	100
30.6	0	0	31.4	0	100	32.2	0	100
30.7	65	10	31.5	0	100	32.3	0	100
30.8	83	22	31.5	0	100	32.3	0	100

QI Hai-tao, PAN Jun-jie, ZHANG Jing-lin, WANG Rui-hao
Chinese Journal of Energetic Materials, **2011**, **19**(**1**): **86 -88**

The nano-α-Al_2O_3 powder was prepared by spray-precipitation method, and it was measured by 90Plus Particle Size Analyzer.

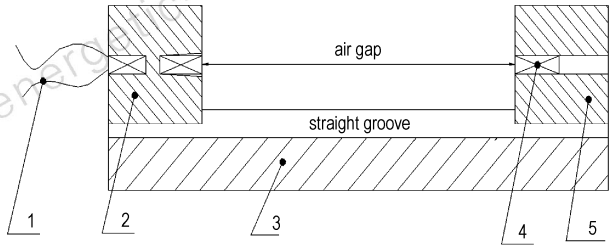
Preparation and Characterization of Nanometer Zirconia via Explosive Detonation Technique



HOU Yi-feng, LIU Yu-cun, WANG Zuo-shan,
LIU Feng, ZHANG Mei-jing
Chinese Journal of Energetic Materials,2011,19(1): 89 -93

Nanometer polycrystal zirconia powder was prepared by explosive detonation technique.

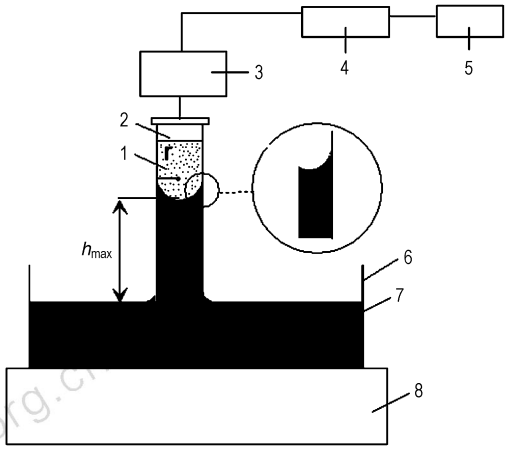
Initiating Ability of Through Bulkhead Explosive Initiator for Oil Well Usage



PENG Jia-bin, YANG Xue-gui, ZHANG Song-qiao, LI Zhe-yu
Chinese Journal of Energetic Materials,2011,19(1): 94 -97

A new kind of through bulkhead explosive initiator for oil well usage was designed. Its initiating ability in the air was studied.

Surface Energy of HNS and NQ



TIAN Hong-yuan, ZHOU Wen-jing, MA Ya-nan,
ZHOU Cheng, SHANG Li-peng, WANG Lin
Chinese Journal of Energetic Materials,2011,19(1): 98 -101

The contact angles, surface free energies and dispersive, polar component of hexanitrostilbene (HNS), nitroguanidine (NQ) and the paste were determined and were calculated by the wicking permeation method and the Washburn equation.

On-line Testing Technique for Moisture-bearing Powder by Capacitor Method

HAN Min-yuan, ZHENG Jian-li,
SONG Wen-ai, YANG Shun-min
Chinese Journal of Energetic Materials,2011,19(1): 102 -105

The theoretical analysis and experimental study on the principle of the testing technique for the moisture-bearing powder by capacitor method were introduced, and the relationships between the water content, the weight and the capacitor mean were illustrated.

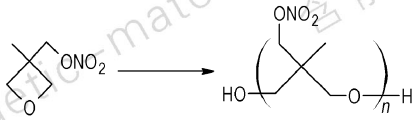
Solution of a New Instrument towards Measuring Burning Rate and Pressure Function of Propellants

JIANG Ying-wu

Chinese Journal of Energetic Materials,**2011**,**19**(**1**): **106 -112**

This report presents a primary solution towards a high efficient instrument for measuring propellant burning rate based on the thin-layer of composite solid propellant (TLCSP).

Review on Synthesis, Properties and Applications of NIMMO and its Polymer

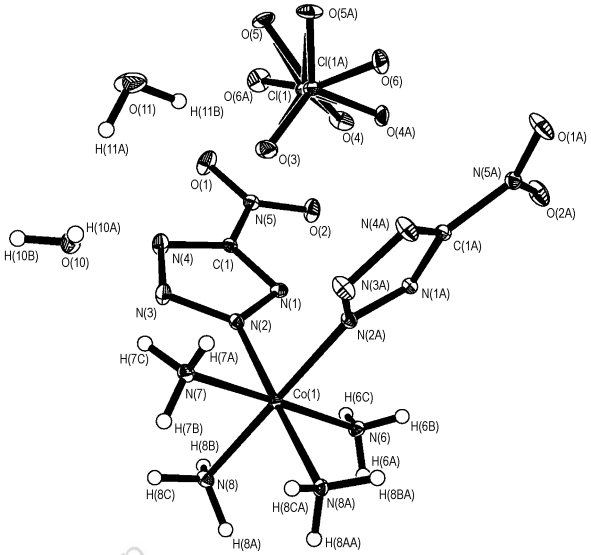


LIAO Lin-quan, ZHENG Ya, LI Ji-zhen

Chinese Journal of Energetic Materials,**2011**,**19**(**1**): **113 -118**

The synthesis, properties and applications of 3-nitatomethyl-3-methyl oxetane (NIMMO) and its polymer (PNIMMO) were reviewed.

Structure Investigation of a Novel Nitrogen-rich Energetic Complex: Tetrammine-*cis*-bis (5-nitro-2*H*-tetrazole-N^2) Cobalt(Ⅲ) Perchlorate Dihydrate



LI Zhi-min, YIN Ming, ZHANG Jian-guo, ZHANG Tong-lai, SHU Yuan-jie, YANG Li, WU Bi-dong

Chinese Journal of Energetic Materials,**2011**,**19**(**1**): **119 -120**

The crystal of tetrammine-*cis*-bis (5-nitro-2*H*-tetrazole-N^2) cobalt (Ⅲ) perchlorate dihydrate was obtained and structurally characterized by applying X-ray single-crystal diffraction. Due to the presence of the two water molecules, a great amount of hydrogen bonds were formed, which linked the molecules together to a three-dimensional neat structure, and the packing method various a lot contrast to the anhydrous BNCP.

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