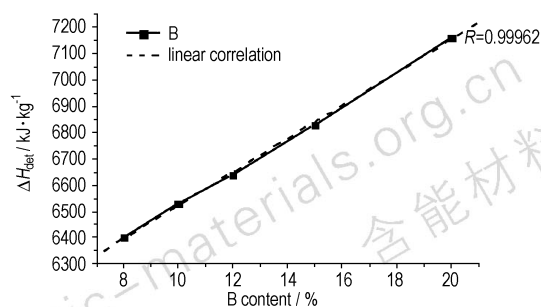


### Detonation Heat of Boron-contained Explosive Based on RDX

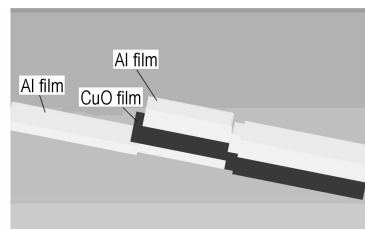
HUANG Ya-feng, WANG Xiao-feng, FENG Xiao-jun  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 363–365



The heats of detonation ( $Q_{det}$ ) of seven RDX based boron-contained explosives were measured by standard method of GJB772A–97–701.1, and theoretical calculation method. Results show that there is a linear relationship between  $Q_{det}$  of explosive mixtures and the boron content from 8% to 20%.

### Electrical-explosion Performance of Dielectric Structure Pyrotechnic Initiators Prepared by Al/CuO Reactive Multilayer Films

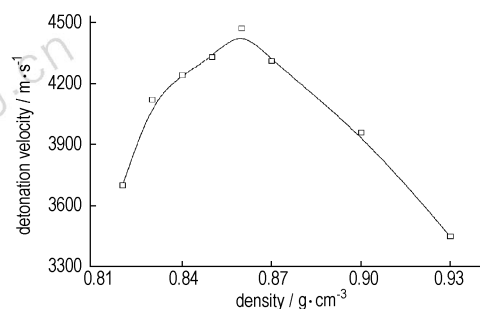
ZHU Peng, ZHOU Xiang, SHEN Rui-qi, YE Ying-hua, HU Yan  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 366–369



Dielectric structure Al/CuO multilayer film initiator consists of essentially two Al films separated by CuO film. Al films act as both the reactive conductor and contact pad at the top and bottom layers, respectively, while CuO film acts as dielectric layer and makes up nanoscale thermite together with two Al films. This special structure also looks like one small sandwich, which can make every layer have the largest contact area so as to release more energy when exothermic reaction takes place.

### Experimental Investigation of a New ANFO Explosive

XU Zhi-xiang, LIU Da-bin, HU Yi-ting  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 370–372



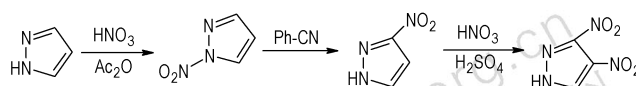
A new type of ANFO was investigated to solve low detonation velocity. The explosives were made of ammonium nitrate water solution, surfactant, oil by C—O—H chemical structure, which was dried under vacuum condition.

### Synthesis and Stability of UDMH Oxalate

MU Xiao-gang, GOU Xiao-li, LIU Xiang-xuan, ZHANG You-zhi  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 373–376

The thermal behavior of unsymmetrical dimethylhydrazine (UDMH) oxalate in a temperature-programmed mode have been investigated by means of DSC, TG-DTG.

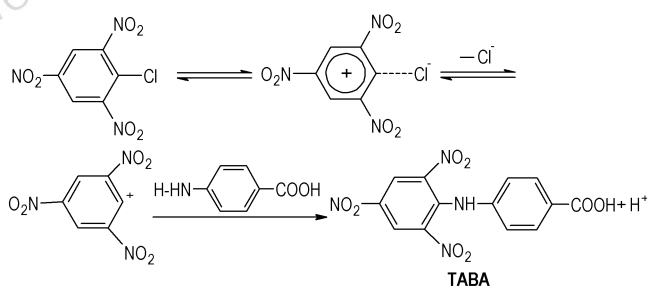
### Improved Synthesis of 3,4-Dinitropyrazole



WANG Ying-lei, JI Yue-ping, CHEN Bin, WANG Wei,  
GAO Fu-lei  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 377 – 379

3, 4-dinitro-pyrazole ( DNP ) was synthesized from pyrazole via N-nitration, rearrangement and C-nitration. Both N-nitration and C-nitration procedures were improved.

### Synthesis and Characterization of 4-(2,4,6-trinitroanilino) Benzoic Acid and Its Lead and Copper Salts



CHANG Pei, HUANG Xin-ping, ZHENG Xiao-dong, WANG Bo-zhou, LI Pu-rui, TANG Wang, JIANG Jun  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 380 – 383

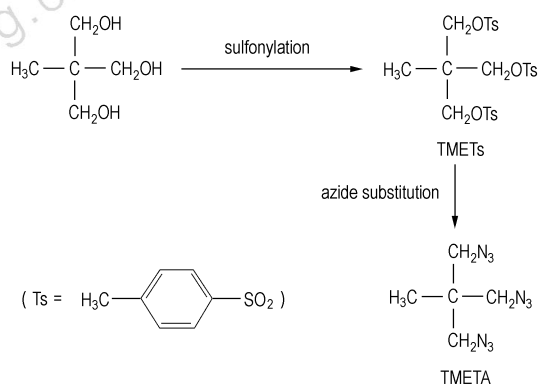
TABA was synthesized by condensation from 2, 4, 6-trinitrophenyl chloride (picryl chloride) and *p*-aminobenzoic acid with a yield of 94.0% and purity of 98.9% , and its lead and copper salts by the reaction of TABA with acetate.

### Determination of Propanetriol Dinitrate in NG/TEGDN by HPLC-TOFMS

NIE Hai-ying, MA Xin-gang, ZHANG Jin-min  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 384 – 387

The impurities of propanetriol dinitrate in NG/TEGDN were determined by liquid chromatography photodiode array detection/electrospray ionization time of flight spectromass ( HPLC-TOFMS ).

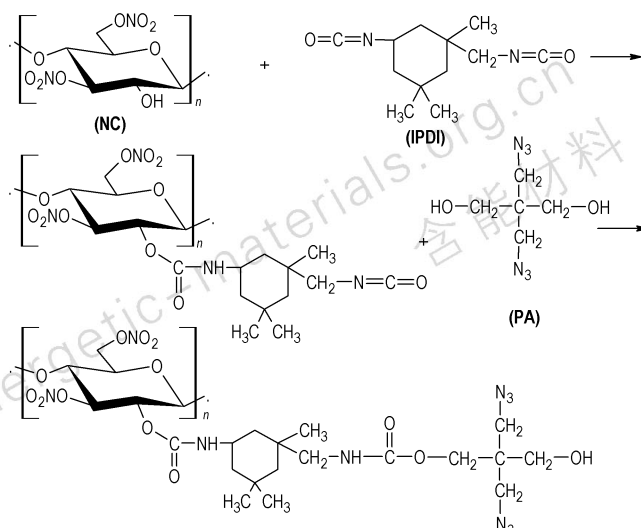
### Synthesis and Properties of 1,1,1-Tris ( azidomethyl ) ethane



JI Yue-ping, WANG Ying-lei, LIU Wei-xiao, CHEN Bin, LI Pu-rui  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 388 – 390

A new energetic plasticizer 1, 1, 1-tris ( azidomethyl ) ethane ( TMETA ) was synthesized from trimethylethane by sulfonation and azide substitution. The structures were confirmed by IR, NMR and elemental analysis, and some properties of TMETA were measured.

### Synthesis and Properties of Azido-sidechain Branched NC

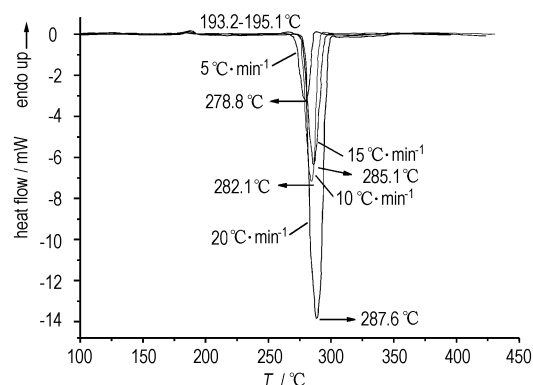


YANG Fei-fei, SHAO Zi-qiang, WANG Fei-jun,  
WANG Wen-jun, ZHANG You-de, WANG Hui-qing

*Chinese Journal of Energetic Materials*, 2011, 19(4): 391–395

PA-IPDI modified branched NC, a substitute for NC, was synthesised and characterized by IR, elemental analyses, TG, DSC and DMA.

### On Thermal Decomposition Kinetics and Thermal Safety of HMX

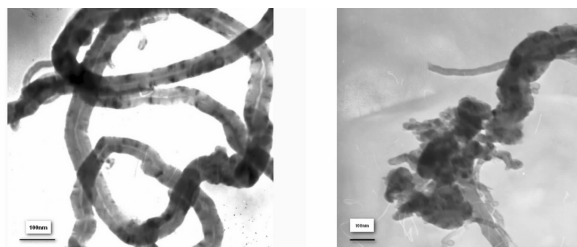


TANG Zhan, YANG Li, QIAO Xiao-jing, ZHANG Tong-lai,  
YU Wei-fei

*Chinese Journal of Energetic Materials*, 2011, 19(4): 396–400

By using the DSC technique, the thermal decomposition characteristic parameters of HMX are obtained: onset temperature ( $T_{eo}$ ), inflection temperature ( $T_i$ ), peak temperature ( $T_p$ ), final temperature ( $T_f$ ), decomposition enthalpy ( $\Delta H$ ), apparent activation energy ( $E$ ), index factor ( $A$ ), reaction order ( $n$ ), the critical temperature of thermal explosion ( $T_b$ ) and self-accelerating decomposition temperature ( $T_{SADT}$ ). By using the thermal decomposition data and the Malek method, the thermal decomposition mechanism of HMX is obtained;  $f(\alpha) = (1 - \alpha)^2$ .

### Morphology Character and Thermal Behavior of CNTs/KClO<sub>4</sub>



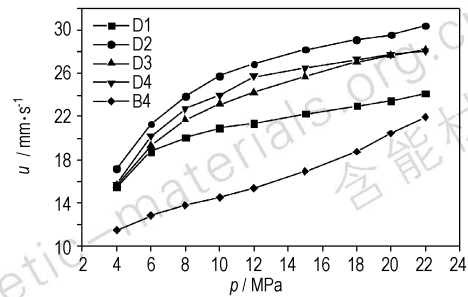
ZHANG Bu-yun, JIAO Qing-jie, REN Hui, JIA Yong-jie,  
ZHANG Kuó, WU Guan-nan, LIU Guo-quan

*Chinese Journal of Energetic Materials*, 2011, 19(4): 401–404

The carbon nano-tubes/potassium perchlorate (CNTs/KClO<sub>4</sub>) composite was prepared. SEM, TEM, DSC and specific surface area (SSA) analysis were used to investigate its morphology character and thermal behavior.

### Combustion Performance of Double-based Propellant with a Lead-free Catalyst Gal-BiCu

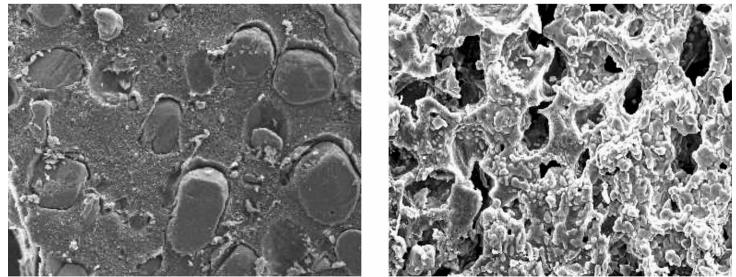
PI Wen-feng, SONG Xiu-duo, ZHANG Chao, XIE Bo, WANG Jiang-ning, ZHAO Feng-qi  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 405–409



The burning rate and burning rate-pressure exponent of the unleaded double base propellant were modified. The regularity of combustion performance was investigated by changing the content of catalyst Gal-BiCu, using different plasticizers and adding carbon black in different grain diameter.

### Extraction Technology of AP from Expired Composite Solid Propellants

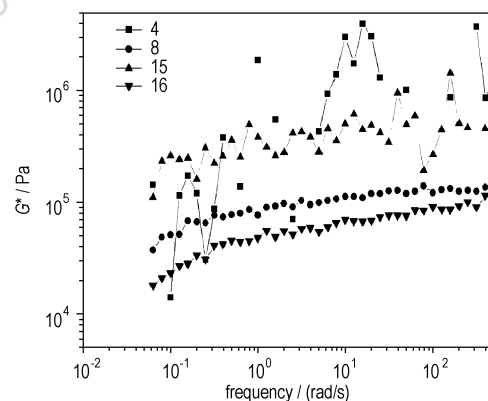
WANG Jun, LIN Xiang-yang, LIU Ai-zhuan, LI Duo, PAN Ren-ming  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 410–414



Oxidizer AP was extracted from HTPB solid propellants using water as extraction solvent and the effects on AP extraction rate were studied. Scanning Electron Microscope was used to characterize the propellants before and after extraction of AP.

### Instant Gelation of a Simulated Agent for Liquid Propellants at Room Temperature and Rheological Property Studies of Relevant Gels

LIU Kai-qiang, ZHAO Ke-ru, CHEN Xiang-li, ZHANG He-lan, FANG Yu  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 415–419

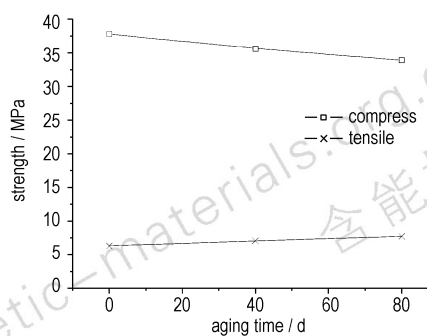


Factors affecting rheological properties of simulated gels for gelled propellant have been investigated through an orthogonal test, and furthermore an optimized formula was determined via a frequency sweep test.

### Reverse Change of Compressive and Tensile Properties of PBX Based on HMX Aged at High Temperature

WEN Mao-ping, ZHOU Hong-ping, XU Tao, CHEN Tian-na, PANG Hai-yan

*Chinese Journal of Energetic Materials*, 2011, 19(4): 420–424

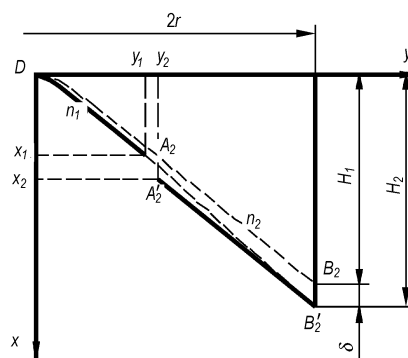


Reversed change of the compress and tensile properties of PBX based on HMX aged at 75 °C were studied using the computer tomography (CT), X-ray photoelectron spectrometer (XPS) and ultrasonic microscope.

### Design of Interfacial Curve of Small-sized Explosive Planar Wave Lens

HUANG Jiao-hu, YIN Rui, HUANG hui, WEI Zhi-yong, ZHANG Qiu

*Chinese Journal of Energetic Materials*, 2011, 19(4): 425–427

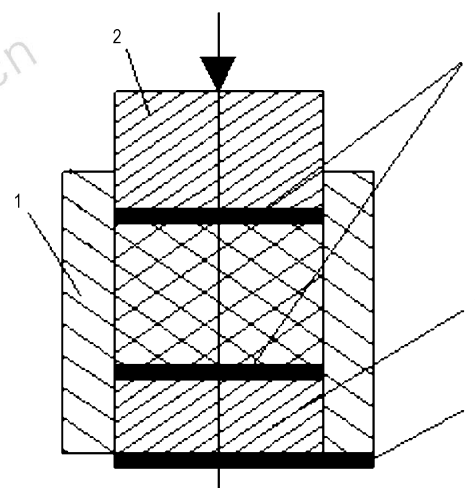


Based on the actual detonation velocity of each subsection of the wave lens which was reversely calculated according to the wave plot, the interfacial curve was designed based on Fermat's principle.

### Analysis of Impact Sensitivity Characteristics for Typical Explosive Cylinder

GAO Li-long, NIU Yu-lei, WANG Hao, WANG Cai-ling, LI Yuan-yuan, GUO Xi

*Chinese Journal of Energetic Materials*, 2011, 19(4): 428–431



The impact sensitivities of typical explosive cylinders were measured with the 400 kg drop hammer. Impact sensitivity of typical explosive charge is closely related to its compressive strength and molding process.

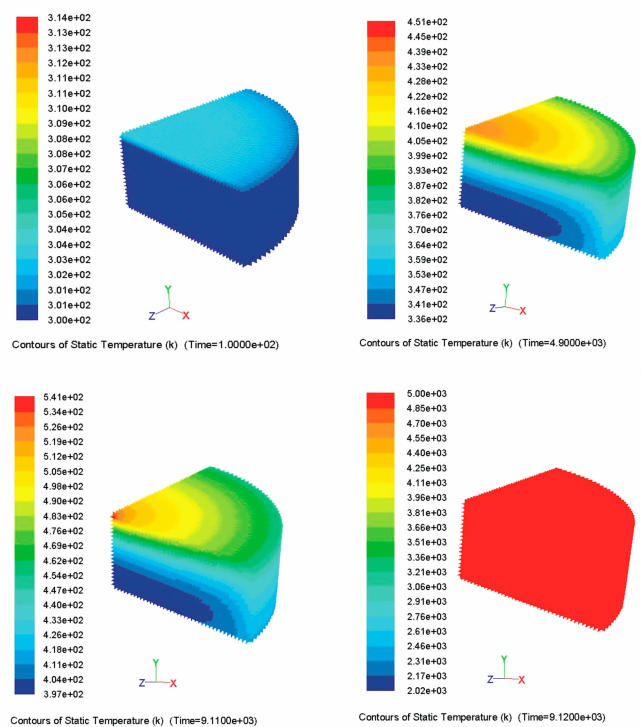
### Effect of Shell Thickness on Response Level of Confined TNT in Fast Cook-off



SUN Pei-peī, NAN Hai, NIU Yu-lei, XI Peng, LI Wei, LU Fu-guo  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 432 –435

Using the self-designing fast cook-off instrument and PDSC to study the TNT's thermal decompositions characteristics and thickness of the confinement's influence on the TNT fast cook-off test.

### Numerical Simulation of Cook-off for Explosive at Different Heat Flux



ZHANG Xiao-li, HONG Tao, WANG Jin-xiang, JIA Xian-zhen  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 436 –441

The heat transfer in the GHL explosive confined in the steel shell under different heat flux was numerically investigated. The temperature distribution at different times, ignition time and ignition location as shown in figure were obtained.

### Effect of Particle Size of Nitroamine Explosives on Cook-off Sensitivity

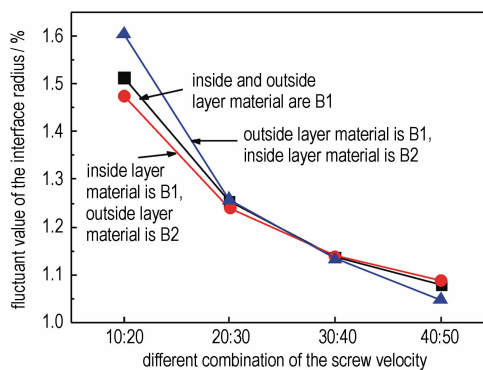
ZHOU Dei-cai, Lü Chun-ling, LI Mei, GENG Xiao-heng, ZHANG Jun

*Chinese Journal of Energetic Materials*, 2011, 19(4) : 442 –444

Three kinds of RDX, HMX, PETN samples with different particle size (centimillimeter, micron, submicron) were prepared by spray fine and dripping methods respectively. Scanning electron microscope (SEM) and laser particle analyzer were used to characterize samples. The cook-off thermal sensitivity of RDX, HMX, PETN samples were tested and analyzed by GJB772A –1997 method 608.1.

### Numerical Calculation on the Fluctuation Factors of Grain Size for Variable-burning Rate Propellant

MA Zhong-liang, ZHU Lin, GAO Ke-zheng, XIAO Zhong-liang  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 445 – 449



The fluctuation factors of grain size of the variable-burning rate propellant was calculated by numerical simulation method.

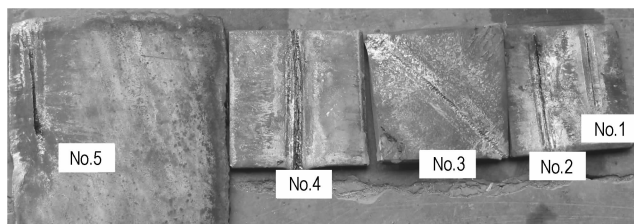
### Damage Effects of Energetic Fragment Warhead

PENG Fei, YU Dao-qiang, YANG Shi-qing, JIANG Jian-ping, LOU Jian, WANG Wei-ming  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 450 – 453

A kind of energetic fragment warhead containing Al/PTFE in the mass proportion of 30 to 70 was designed and prepared. The damage effects of the warhead on steel target with 2.5, 10, 20 mm were studied.

### Application Study of Flexible and Linear Shaped Charge Cutter

JIANG Yao-gang, SHEN Zhao-wu, GONG Zhi-gang, NI Xiao-jun, WENG Feng-quan  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 454 – 458



The steel plates were penetrated by different types of shaped charge cutter with lead shell.

### Thermo Dynamic Analysis, Composition Design and Experimental Study on Metal-Cutting Pyrotechnic Composition

WANG Peng, ZHANG Jing  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 459 – 463

Adiabatic reaction temperature of pyrotechnic composition was calculated by chemical thermodynamics. Combustion velocity of pyrotechnic composition was experimentally studied. The best composition was obtained by uniform design experiments, and a kind of pyrotechnic composition used for high temperature metal melting was studied.

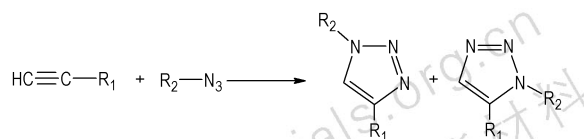
### A Brief Summary about Clean Burning Technology of Gun Propellant and Charge

DU Ping, HE Wei-dong, LIAO Xin  
*Chinese Journal of Energetic Materials*, 2011, 19(4) : 464 – 468



Improving one gun-charge design project is an effective method to enhance propellant and charge clean burning performance. From the figure, it can be seen that residues adhering to breechblock surface have reduced obviously after improving gun charge project.

### Application of 1,3-Dipolar Cycloaddition in Azide Propellants



CHEN Lu-yang, TANG Cheng-zhi, LI Zhong-you,  
CHEN Zhong-e

*Chinese Journal of Energetic Materials*, 2011, 19(4): 469–472

1,3-dipolar cycloaddition reaction between an alkyne and azide compound can be used as cure of azido binders to get a crosslinked network.

### Recent Progress in Green Tetrazoles Primary Explosives

ZHANG Guang-quan

*Chinese Journal of Energetic Materials*, 2011, 19(4): 473–478

Copper(I) nitrotetrazolate and some series of 5-nitrotetrazolato-N<sup>2</sup>-ferrate hierarchies which do not pose health risks to mankind and cause much less pollution to the environment are interesting, and might be suitable to replace lead primary explosives.

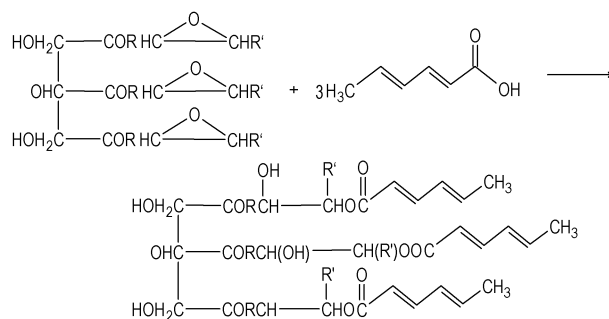
### The Synthesis of Silica Nanotubes Using Soft Templates



LUAN Lin-dong, DENG Jian-guo, HUANG Hui, JI Lan-xiang  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 479–480

Silica nanotubes were prepared from sodium dodecyl sulfonate (SDBS) which formed shapedmicelle in a particular situation using the shapedmicelle as templates. The external diameter of silica nanotubes were about 50 nm.

### Synthesis of UV Curing Epoxidized Soybean Oil Ester-hexadiene



ZHANG Xiu-yun, DENG Jian-guo, HUANG Yi-gang  
*Chinese Journal of Energetic Materials*, 2011, 19(4): 481–482

Epoxidized soybean oil hexadiene-ester was synthesized by the reaction of epoxidized soybean oil (ESO) with sorbic acid.

Executive editor: WANG Yan-xiu JIANG Mei; Computer typesetter: ZHANG Gui-hong