

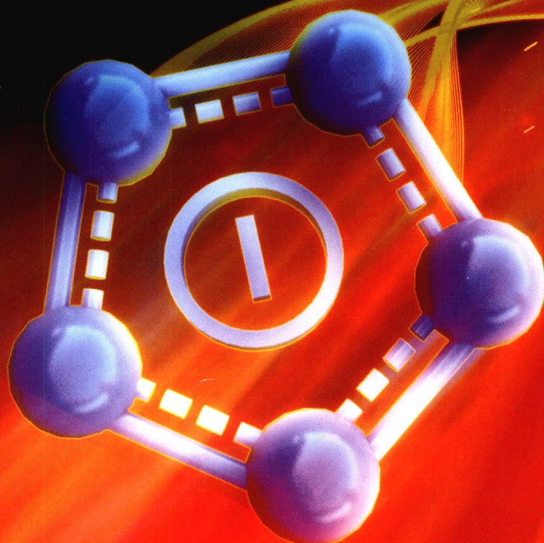
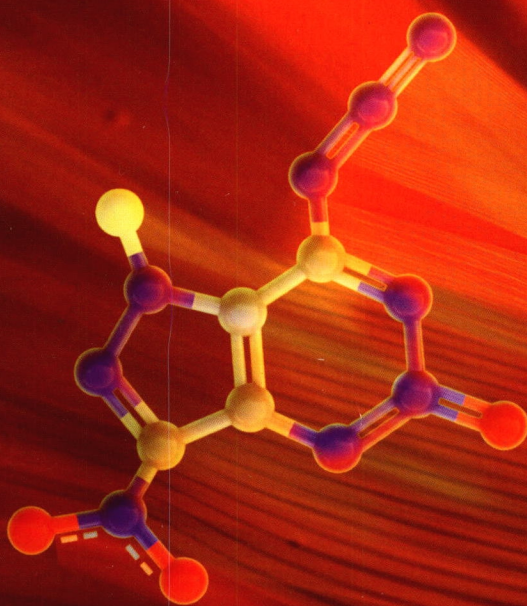
Engineering

September 2020



**Energetic Materials and
Interdisciplinary Science**

Pages 976–1027



万方数据



Editorial

- 957 Editorial for the Special Issue on Energetic Materials and Interdisciplinary Sciences
Xuguang Wang et al.

News & Highlights

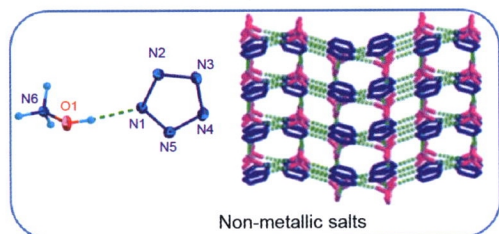
- 958 Global CO₂ Emissions Level Off in 2019, with a Drop Predicted in 2020
Sean O'Neill
- 960 The Rise of No/Low Code Software Development—No Experience Needed?
Marcus Woo
- 962 Engineering Running Shoes to Break Records
Chris Palmer

Views & Comments

- 964 Pentazolate Anion *Cyclo-N₅⁻*: Development of a New Energetic Material
Qiuhan Lin et al.

Engineering Achievements

- 967 Hybrid Rice
Qiang He et al.



Page 965

Topic Insights

- 974 Energetic Materials: Novel Syntheses and Diagnostics
Sheng-Nian Luo et al.

Research

Energetic Materials and Interdisciplinary Science—Perspective

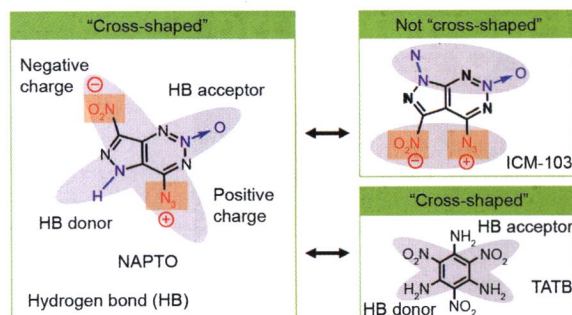
- 976 Extreme Energetic Materials at Ultrahigh Pressures
Ho-Kwang Mao et al.

Energetic Materials and Interdisciplinary Science—Review

- 981 Review of the Current Synthesis and Properties of Energetic Pentazolate and Derivatives Thereof
Dominique R. Wozniak et al.
- 992 Novel X-Ray and Optical Diagnostics for Studying Energetic Materials: A Review
Yiyang Zhang et al.

Energetic Materials and Interdisciplinary Science—Article

- 1006 Construction of an Unusual Two-Dimensional Layered Structure for Fused-Ring Energetic Materials with High Energy and Good Stability
Yongan Feng et al.



Page 1007

Contents

- 1013** Metal-Free Hexagonal Perovskite High-Energetic Materials with $\text{NH}_3\text{OH}^+/\text{NH}_2\text{NH}_3^+$ as B-Site Cations
Yu Shang et al.

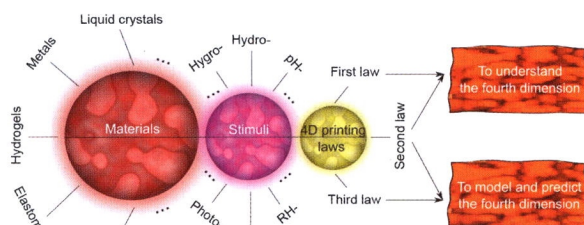
- 1019** Enhancing the Combustion Performance of Metastable Al@AP/PVDF Nanocomposites by Doping with Graphene Oxide
Shuwen Chen et al.

Clinical Engineering—Article

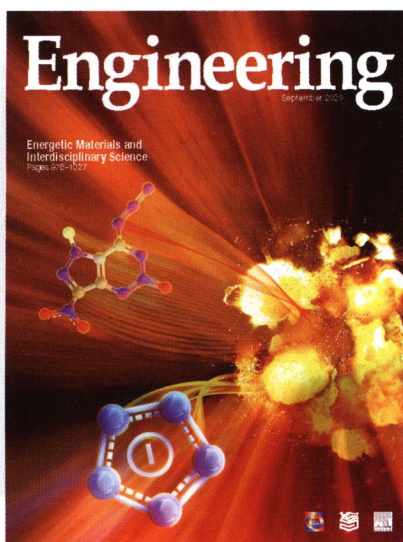
- 1028** Clinical Correlates and Prognostic Value of Different Metastatic Sites in Gastric and Colorectal Signet Ring Cell Carcinoma
Jingjing Wu et al.

4D Printing—Article

- 1035** Laws of 4D Printing
Farhang Momeni et al.



Page 1039



ON THE COVER

Energetic materials (EMs) are an important area in the field of materials science, as numerous new scientific problems and engineering technologies involve research on and applications of EMs. The front part of this cover image depicts two of the latest achievements in the field of synthetic EMs: the all-nitrogen pentazolate anion (N_5^-); and a novel ultraflat 2D-layered EM, 4-nitro-7-azido-pyrazol-[3,4-*d*]-1,2,3-triazine-2-oxide (NAPTO). Development of the N_5^- anion stemmed from an aim to push the energy limit of EMs, while the design and synthesis of NAPTO were based on the goal of developing safe yet high-energy EMs. The explosion of EMs shown on the back part of the cover image illustrates the basic property of such materials—their ability to release large amounts of energy, usually in the form of strong light, heat, and high-speed gas emissions. The pictured explosion also symbolizes the rapid and widespread expansion of EM and related interdisciplinary research in recent years.

Engineering Science and Technology

Create a Better Future



In 1998, China launched the Super Hybrid Rice Breeding Research Program. Chinese scientists have since met the breeding goals of the 1st phase of the program in 2000 ($10.5 \text{ t} \cdot \text{hm}^{-2}$), those of the 2nd phase in 2004 ($12.0 \text{ t} \cdot \text{hm}^{-2}$), those of the 3rd phase in 2012 ($13.5 \text{ t} \cdot \text{hm}^{-2}$), and those of the 4th phase in 2014 ($15.0 \text{ t} \cdot \text{hm}^{-2}$). This photograph shows the ground-breaking new hybrid breed named Guangliangyou 1128, from the 3rd phase of the super hybrid rice program. (Photographer: Jingmin Wang)

Engineering is intended to provide a high-level platform
where academic achievements of great importance
in engineering science and technology
can be disseminated and shared.

ISSN 2095-8099

工程 (英文)



CN 10-1244/N

Distribution code Q1849

国内发行代号 80-744

Available online <http://www.engineering.org.cn>