ISSN 1001-0521 · e-ISSN 1867-7185
CN 11-2112/TF · CODEN RARME 8

Volume 42 • Number 4 • April 2023

RARE METALS

www.springer.com/journal/12598

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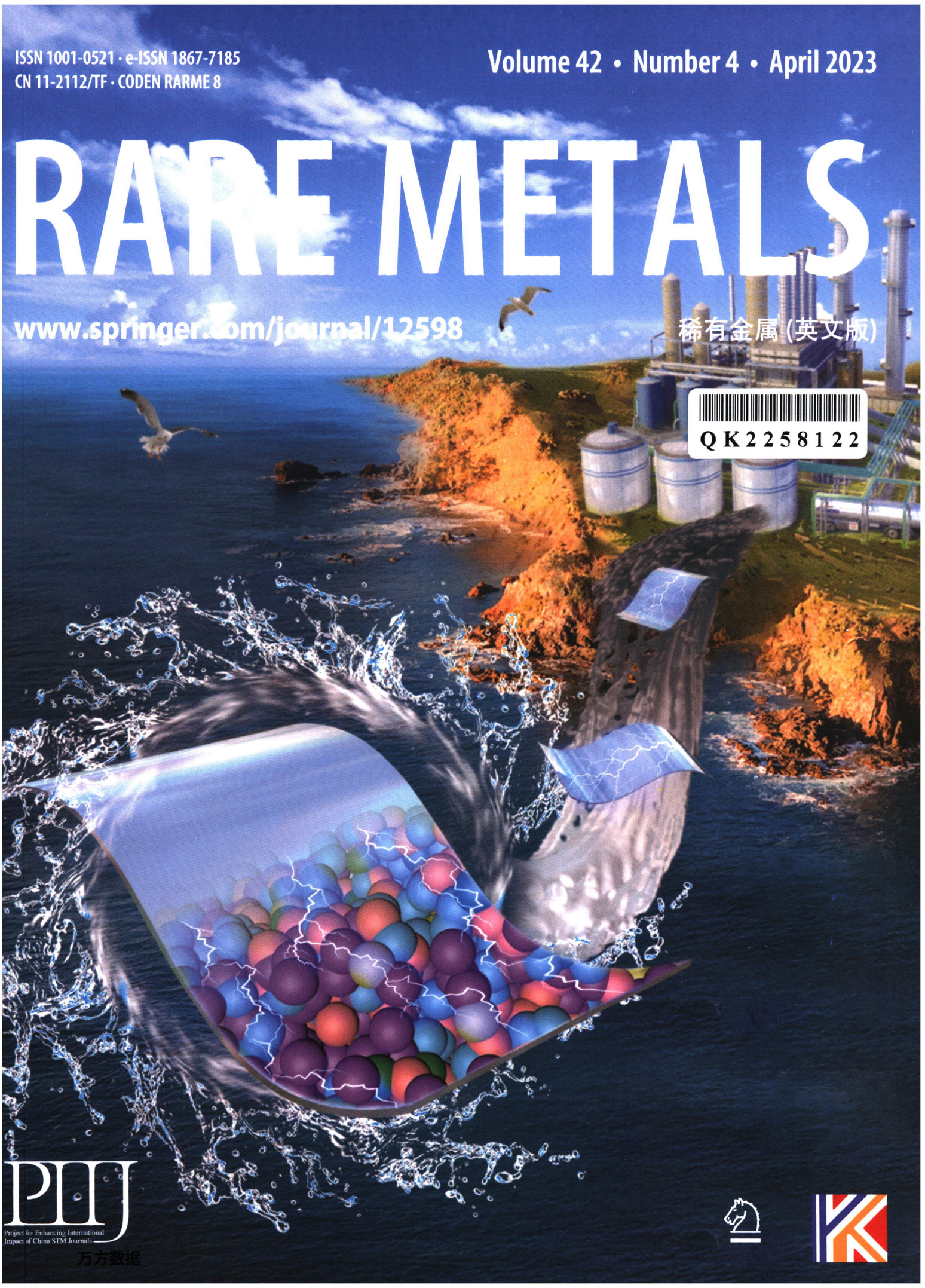

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Volume 42 · Number 4 · April 2023

Cover Picture
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Cover story

Highly efficient cobalt-based amorphous catalyst for peroxymonosulfate activation towards wastewater remediation

(Xue-Chun Zhou, Shuang-Qin Chen*, Ming-Jie Zhou, Mai Li, Si Lan*, Tao Feng* pp. 1160–1174)

In recent decades, water pollution aroused by various contaminants has become a critical societal issue, due to its adverse effects on human beings and ecosystem. Metallic glasses (MGs) are rising novae in the catalytic field, due to their unique amorphous structure, such as large residual stress, and high density of low coordination sites. However, there is still an absence of suitable MGs' catalysts for advanced oxidation processes (AOPs) with peroxymonosulfate (PMS), the most efficient and promising wastewater remediation technology. Particularly, PMS was utilized for AOPs, which is suitable for a wider pH range, and generated $SO_4^{\bullet-}$ possesses high oxidation potential and long half-life. Herein, Co-MG with nominal composition of $Co_{67}Fe_4Mo_{1.5}Si_{16.5}B_{11}$ (at%) was utilized as catalyst of PMS for azo dye degradation. Azo dyes are the largest class of synthetic dyes used in the textile industry and have caused serious ecological and environmental problems due to their toxicity, non-biodegradability and potential carcinogenicity. The results demonstrated that the Co-MG/PMS system had an order of magnitude higher efficiency on OII degradation, compared with the Fe-MG/PMS system. For fundamental study and field application, the effect of adding inorganic anions (Cl^-, HCO_3^-, $H_2PO_4^-$, SO_4^{2-}, NO_3^-), environmental factors, and cycle experiments on the degradation properties of Co-MG was investigated emphatically to evaluate overall catalytic performance. It has demonstrated that the Co-MG with better recyclability, more stability and better corrosion resistance contrasted to Fe-MGs. The present results provide not only a new candidate but also shed light on exploring a new kind of AOPs system based on cobalt MGs for wastewater treatment.

Edited and Published by Youke Publishing Co., Ltd.
(No. 2, Xinjiekouwai Str., 100088 Beijing, China)
Tel.: +86 10 82241917; Fax:+86 10 82240869
Email: raremetals@grinm.com
Administrator: China Association for Science and Technology
Sponsor: The Nonferrous Metals Society of China
China GRINM Group Co., Ltd.
Printer: Beijing Shengpinfengshang Technology Development Co., Ltd., Beijing, China

ISSN 1001-0521
9 771001 052237 04
Price: RMB 500