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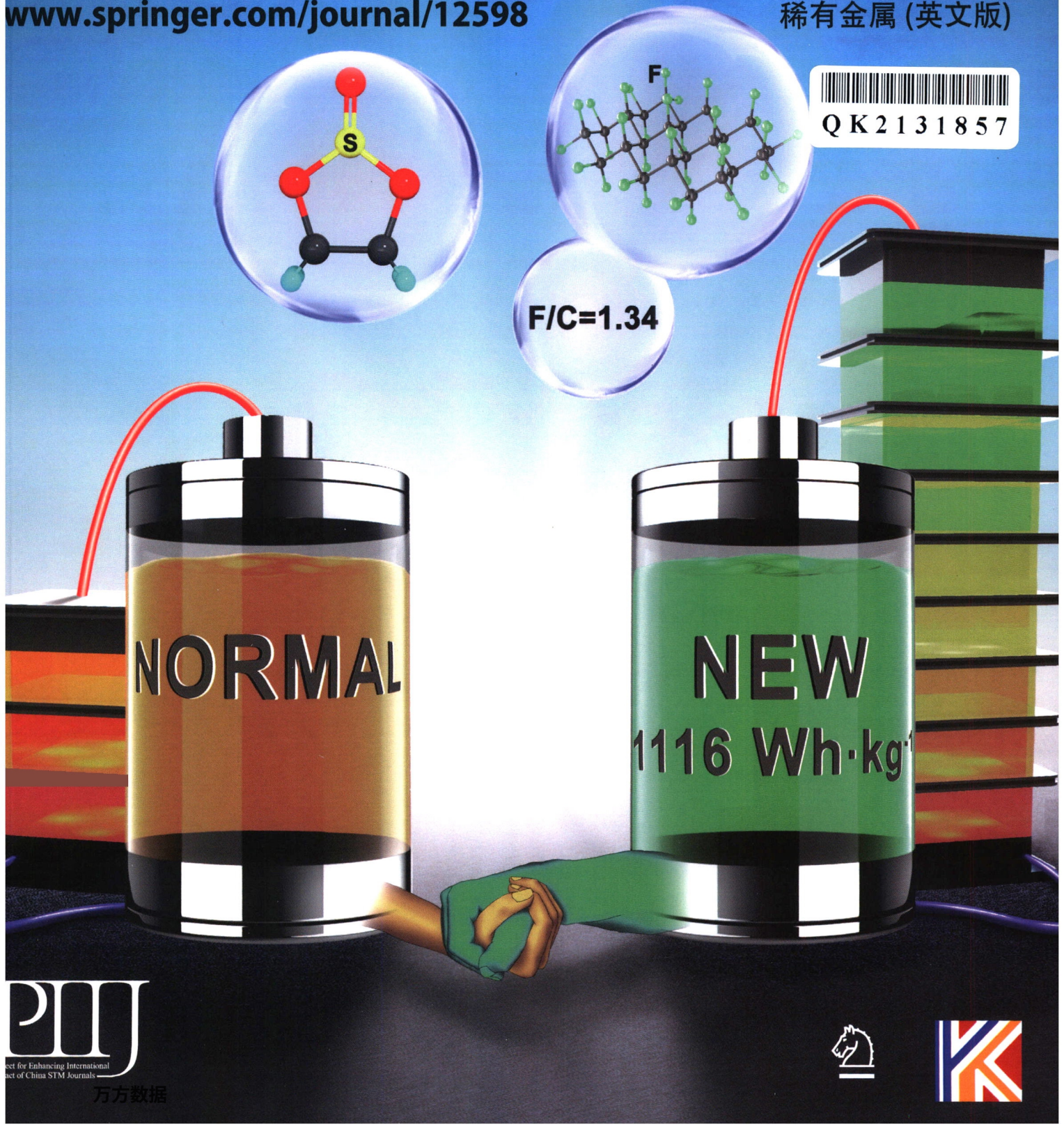

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Cover Picture
X.-X. Yang et al. Fluorinated graphite nanosheets for ultrahigh-capacity lithium primary batteries

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Cover story

(Xiao-Xia Yang, Guan-Jun Zhang, Bao-Sheng Bai, Yu Li, Yi-Xiao Li,Yong Yang, Xian Jian, Xi-Wen Wang*, pp. 1708–1718)

Fluorinated graphite nanosheets for ultrahigh-capacity lithium primary batteries

Lithium fluorocarbon (Li/CF_X) battery is the battery system with the highest specific energy in solid electrode chemical power supply. The F/C limit of conventional fluorocarbons is 1, and the theoretical specific capacity is 865mAh·g^{-1}. Because the energy of the material is difficult to be fully utilized in the practical battery, the specific energy of the battery is usually lower than 700Wh·kg^{-1}. At this concern, Wang et al. carried out innovative research on the preparation of fluorocarbon materials and electrodes, breaking through the F/C and specific capacity limits of existing fluorocarbon materials, and providing a new strategy for the realization of ultra-high specific energy lithium galvanic battery. By adjusting the temperature, the edge defects and $-CF_2$, $-CF_3$ perfluorinated functional group active sites are introduced into graphite nanosheets (NSs) in the form of covalent/ semi-covalent/ semi-ionic bonds, which broke the restriction of fluoro-carbon ratio to achieve ultra-thin microstructure with high performances. Using the ultra-high specific capacity CF_x NSs, combined with the "dual function" electrolyte that both conduct lithium ions and participate in the lithium synthesis reaction, and the lightweight battery structure design, a 24-Ah soft-packed lithium fluorocarbon primary battery with specific energy up to 1116 Wh•kg^{-1} was developed, which is the highest level reported in the relevant field at present.

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