Elliptical Fe₂O₃ Particles / Reduced Graphene Oxide Composite Materials for Supercapacitors and Their Electrochemical Properties in Different Electrolytes

Meirong Li^{1,2}, Yurong Ren^{1,2,*}, Haiyan Chen³, Xiaobing Huang⁴, Jianning Ding^{1,2,5,*}

¹ School of Materials Science and Engineering, Changzhou University, Changzhou 213000, China

² Jiangsu Province Cultivation base for State Key Laboratory of Photovoltaic Science and Technology, Changzhou University, Changzhou, 213164

³ NO. 47. Qingyang North Rd., Tianning district, Changzhou, Jiangsu Province, P. R. China

⁴ College of Chemistry and Chemical Engineering, Hunan University of Arts and Science, Changde, 41500, China

⁵ Micro/Nano Science and Technology Center, Jiangsu University, Zhenjiang, 212013, China

* E-mail: ryrchem@163.com, ryrchem@cczu.edu.cn

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In this work, a supercapacitor electrode material, Fe₂O₃/rGO composite, was fabricated by the hydrothermal method. A mixture of isopropyl alcohol and deionized water was used as the hydrothermal agent. Structural characterization revealed that the Fe₂O₃ particles in the composites exhibit a unique elliptical structure with significantly increased specific surface area compared to hexagonal Fe₂O₃ particles, thereby allowing more ions to penetrate. The Fe₂O₃/rGO composite has a larger specific capacitance than bare Fe₂O₃ particles in 1M KOH. Additionally, compared to that in 1M Na₂SO₃, 1M Na₂SO₄, 1M KOH and 6M KOH electrolytes, Fe₂O₃/rGO exhibits better electrochemical performance in 6M KOH with 3M methanol.

Keywords: Fe₂O₃; rGO composite; hydrothermal method; supercapacitor.

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