Short Communication

Facile synthesis of hollow Fe₃O₄ nanospheres and their application as drug delivery carrier and anode for lithium-ion batteries

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Multi-functional materials that can be used in a variety of different applications have attracted significant research interest. Herein, we report a facile method for preparing hollow Fe₃O₄ nanospheres with good magnetic properties and substantial surface areas. The as-prepared hollow Fe₃O₄ nanospheres can be used as drug carriers. The chemotherapeutic agent oxorubicin hydrochloride (DOX) was used to study the controlled release behavior of the hollow Fe₃O₄ nanospheres. The drug release curves showed a high DOX loading efficiency and pH-dependent drug release. Less DOX was released at pH 7.4 compared to pH 6.2 due to the protonation of DOX in acidic environments, implying stable release rates. Furthermore, using Fe₃O₄ as an anode in lithium-ion batteries delivers a reversible capacity of 631 mAh g⁻¹ at 2 A g⁻¹, which can be attributed to the specific structure of the hollow Fe₃O₄ nanospheres. Hence, this study provides a novel nano platform based on magnetic targeting and new pH-responsive drug delivery system for cancer treatment.

Keywords: Fe₃O₄ nanospheres, Drug carrier, Lithium ion battery, Anode

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