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Construction and Characterization of a Theranostic System Based on Graphene/Manganese Chelate

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Abstract

Construction of hybrid systems that combine the cancer treatment and diagnosis agents on a single platform, known as theranostic systems, have received great attentions in the field of nanobiomedicine. Here, construction and characterization of a new multifunctional hybrid theranostic system based on RGO, PDA, BSA, DTPA-Mn(II), and MTX constituents, is presented. Accordingly, GO is partially reduced and simultaneously functionalized by dopamine, leading to reduced graphene oxide/polydopamine, RGO-PDA system; and then, the bovine serum albumin protein (BSA) is grafted onto this system. The obtained system, RGO-PDA-BSA, is further decorated with diethylenetriaminepentaacetic acid-Mn(II) as diagnostic system and methotrexate as anticancer drug. Physicochemical characteristics of the RGO-PDA-BSA-DTPA-Mn(II)/MTX system are studied by Fourier transform infrared spectroscopy, atomic force microscopy, and electrochemical methods. The capturing ability of

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