

Synthesize of CuSe/Polydopamine Nanocomposite with Peroxidase-like Activity and Photothermal Effect

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Special Issue Article

Received: 04/09/2020

Accepted: 18/09/2020

Published: 25/09/2020

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Keywords: CuSe, polydopamine,
tetramethylbenzidine.

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INTRODUCTION

Photothermal therapy (PTT) acts as a method of ablate the tumor tissues by employing photo-absorbing agents to generate heat from near infrared (NIR) optical energy. Compared to traditional therapies, the advantages of PTT include minimally invasive, the capability for deep tissue penetration, and minimal effect of nonselective cell death on the surrounding healthy tissue. In this report, CuSe was deposited on polydopamine (PDA) nanoparticles (NPs) for the application of PTT. CuSe has been reported as an ideal photo-sensitizer. PDA was served as a bio-template for the deposition of CuSe, and polyethylene glycol (PEG) was further used to increase the water dispersibility of CuSe/PDA nanosites. The as-prepared CuSe/PDA-PEG nanosites demonstrated strong absorption at NIR region, higher than that of pure PDA NPs at 808 nm, and used in PTT. Moreover, CuSe/PDA-PEG nanosites act as a peroxidase to decompose H₂O₂ to O₂, which catalyze the reaction between the substrate (3,3',5,5'-tetramethylbenzidine (TMB)) and H₂O₂. As a result, our synthesized CuSe/PDA-PEG nanosites showed both peroxidase-like activity and photothermal effect, which can kill cancer cells more effectively.

Biography

He is from Department of Chemical Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan.

Publications

1. ChemInform Abstract: Synthesis and NMR Study of Epimeric Pairs of 2,3-Dihydro- and 2,3,6,7-Tetrahydro-tabersonine and Their Derivatives.
2. Partial synthesis of new indole alkaloid derivatives with biological activity starting from plant material.