

Carbon Dot/Polypyrrole Nanoparticles : High-performance bioimaging and photothermal agents

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Polypyrrole nanoparticles (PPy NPs) have been used as photothermal therapy (PTT) agents due to their excellent near-infrared absorption characteristics. However, PTT using PPy NPs has limitations in that it is difficult to accurately identify treatment effects. In order to overcome these limitations, carbon dots (CDs), which have the advantages of unique fluorescence characteristics, chemical inertness, and environmental-friendly synthesis, can be combined with PPy NPs to develop an innovative PTT-imaging agent. The as-prepared hydrophilic PPy NPs with a rich carboxyl group and high absorbance at 880nm are capable of destroying tumor through high photothermal conversion effect. And, CDs used for this study emit fluorescence around 530 nm and show excellent hydrophilicity and photostability. Therefore, the CDs/PPy NP complex can be utilized as theranostic agents by monitoring therapeutic effects in real time.