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Near-Infrared Rechargeable "Optical Battery" Implant for Irradiation-Free Photodynamic Therapy

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Abstract

As a minimal or noninvasive therapeutic method for tumors, photodynamic therapy (PDT) induced by the external laser irradiations has attracted great attentions. However, the UV-visible responsive property with low tissue penetration and photothermal effect from the prolonged irradiation impedes their further applications. Herein, a near-infrared (NIR) rechargeable "optical battery" for irradiation-free PDT is fabricated by embedding upconversion materials, persistent luminescence materials, photosensitizer into biocompatible polydimethylsiloxane. After 5 seconds quickly charged by 980-nm NIR laser, the PDT "optical battery" can generate green persistent luminescence and produce cytotoxic singlet oxygen for continuous irradiation-free PDT