UV-EMITTING MESOPOROUS SILICA YAG:Pr CORE-SHELL NANOSCINTILLATOR FOR RADIATION MEDIATED PHOTODYNAMIC THERAPY

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Recent advancement photodynamic therapy for cancer has emphasized the potential of using light emission properties of nanoscintillator in response to ionizing radiation, to overcome its limitations. Here we present a novel composite material consisting of UV (300-450 nm) emitting $\text{Y}_3\text{Al}_5\text{O}_{12}^{3+}$ (YP) nanoscintillator core with a mesoporous silica shell. The optimized core-shell nanocomposite of $\text{YP}@\text{SiO}_2@\text{mesoporousSiO}_2$ (YPMS) consists of a sol-gel synthesized pure and crystalline YP core of ~ 75 nm. Covered with thin nonporous silica mid layer and ordered mesoporous silica shell of ~ 14 nm thickness and pore width of ~ 4 nm. The core-shell nanocomposite system was successfully conjugated with folate and Protoporphyrin IX (PPIX) to form the basis of very recently explored X-ray-mediated PDT system. The integration of UV emission of YP nanoscintillator and biological cargo carrying capacity of mesoporous silica can provide a very efficient platform for various biomedical application.

**Keywords:** YAG:Pr, Mesoporous silica, X-ray mediated photodynamic therapy

**References:**


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