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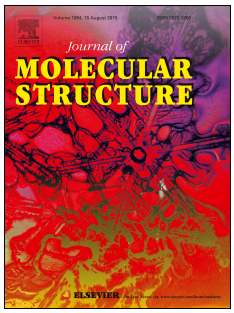

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Characterization of conjugates of $NaYF_4$:Yb,Er,Gd upconversion nanoparticle with aluminium phthalocyanines

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Abstract.

$NaYF_4$:Er/Yb/Gd upconversion nanoparticles (UCNP) capped with amino groups were covalently attached to chloro aluminium tetrasulphonated phthalocyanine (ClAlTSPc) and chloro aluminium tetracarboxy phthalocyanine (ClAlTCPc). The conjugates were characterized using different techniques such as infrared spectroscopy (IR), X-ray photoelectron spectroscopy (XPS), and transmission electron microscopy (TEM). There was a decrease in the intensity of fluorescence emission spectra of the UCNPs at 658 nm in the presence of the phthalocyanines. This decrease indicates an energy transfer between the donor UCNP and conjugated accepting phthalocyanine (Pc), due to Förster resonance energy transfer (FRET). FRET efficiencies of 18% and 21 % for ClAlTSPc and ClAlTCPc, respectively, were obtained. Oxygen generation by ClAlTSPc following FRET was proved.

KEYWORDS: upconversion nanoparticles, aluminium tetrasulfo phthalocyanine, aluminium tetracarboxy phthalocyanine, Förster resonance energy transfer

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