Obtainment of Chitosan films crossilinked by PEG 300 and 400 with Europium β-diketonate chelate and influence to the exposition to ultraviolet radiation in the film lifetime

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ABSTRACT

Luminescent materials containing rare earth complexes with β-diketonate ligands have been intensively studied in recent years. The rare earth complexes present characteristic narrow emission bands in the UV-Vis region, large Stokes shift and the antenna effect that enhance the overall quantum efficiency, As a result, these complexes have found wide applications as luminescent markers, photoluminescent sensors, electroluminescence devices, and multicolor display. In this work, we report the luminescent properties and photostability of chitosan films doped with Eu β-diketonates complexes.

The $[Eu(tta)_3 \cdot (H_2O)_2]$, $[Eu(tta)_3 \cdot (crown)_2]$, complexes were synthesized and characterized by elemental analysis, IR and photoluminescent techniques. The polymer films were prepared by the addition of Eu^{3+} complexes in methanol solution and adding to chitosan/PEG and subsequent drying at 60 ^{o}C. The thermostability of the polymer systems was investigated by thermogravimetric analysis (TGA). The excitation and emission spectra of the polymeric systems were recorded at room temperature.

As shown in Fig.1 the films emit red light under UV radiation of wavelength below 360 nm arising from intraconfigurational $^5D_0 \rightarrow {}^7F_J$ transitions of Eu^{3+}.

Loss in quantum yield was observed when these films are submitted to a long time UV light exposition and this phenomenon was measured.

Figure 1 Chitosan Film doped with Eu^{3+} Chelate.

Keywords: Chitosan films, Eu^{3+} chelate, UV-radiation effect.