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**Applicability of samarium(III) complexes for the role of luminescent molecular sensors for monitoring progress of photopolymerization processes and control of the thickness of polymer coatings.**

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**Abstract**

Applicability of 15 trivalent samarium complexes as novel luminescent probes for monitoring progress of photopolymerization processes or thickness of polymer coatings by the Fluorescence Probe Technique (FPT) was studied. Three groups of samarium(III) complexes were evaluated in cationic photopolymerization of triethylene glycol divinyl ether monomer (TEGDVE) and free-radical photopolymerization of trimethylolpropane triacrylate (TMPTA). The complexes were the derivatives of tris(4,4,4-trifluoro-1-(2-thienyl)-1,3-butanedionate)samarium(III), tris(4,4,4-trifluoro-1-phenyl-1,3-butanedionate)samarium(III) and tris(4,4,4-trifluoro-1-(2-naphthyl)-1,3-butanedionate)samarium(III), which were further coordinated with auxiliary ligands, such as 1,10-phenanthroline, triphenylphosphine oxide, tributylphosphine oxide and trioctylphosphine oxide. It has been found that most of the complexes studied are sensitive enough to be used as luminescent probes for monitoring progress of cationic photopolymerization of vinyl ether monomers over entire range of monomer conversions. In the case of free-radical polymerization processes, the samarium(III) complexes are not sensitive enough to changes of microviscosity and/or micropolarity of the medium, so they cannot be used to monitor progress of the polymerization. However, high stability of luminescence intensity of some of these complexes under free-radical polymerization conditions makes them good candidates

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