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Luminescent Europium Chelates Synthesis and Fluorescence Properties

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The europium(III)-chelating ligand BSPDA containing a thiolated group (BSPDA, an abbreviation of 4,7-bis(sulfhydrylphenyl)-1,10- phenanthroline-2,9-dicarboxylic acid) was synthesized from BCPDA (BCPDA, abbreviated form of 4,7-bis (chlorosulfophenyl)-1,10-phenanthroline-2,9-dicarboxylic acid) by reduction, and then complexed with europium (III, Eu^{3+}) to give 1:1 and 2:1 complexes in molar ratio. The luminescent europium chelates' fluorescence spectra and related lifetimes exceeding several hundreds of microseconds were determined, confirming that the 2:1 complexes have a slightly longer lifetime than the 1:1 complexes because of the more efficient complex interaction and energy transfer from the ligand BSPDA to europium(III) in the former. The results have significant implications to time-resolved-fluorescence-based nanostructuring and detection on biosensor surfaces.

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