MCD: A SENSITIVE METHOD FOR SITE SYMMETRY INVESTIGATION APPLICATION TO FLUOROZIRCONATE GLASSES

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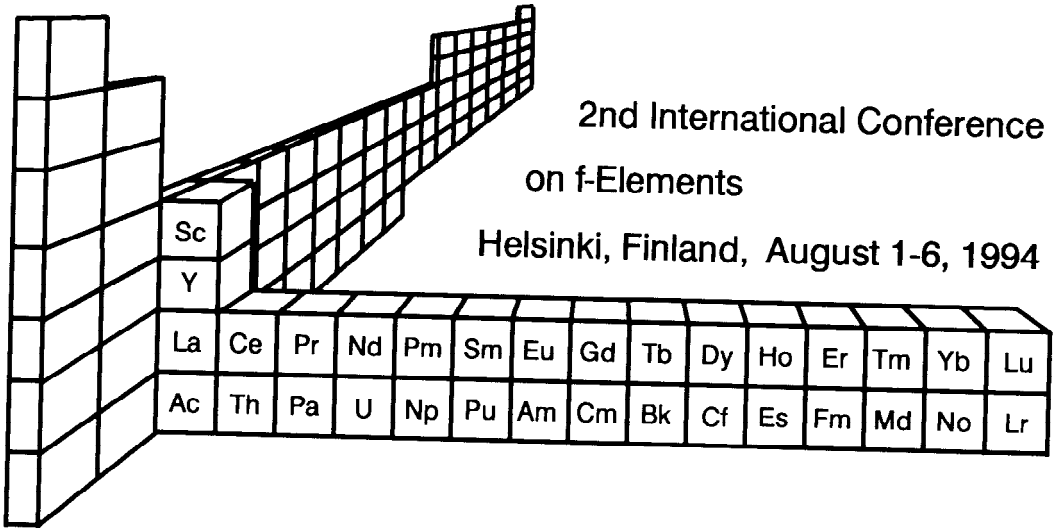
The magnetic circular dichroism (MCD) and optical absorption spectra are recorded for Ho^{3+} ions in fluorozirconate (ZBLAN) glass. The composition of the glass is 53 mol% ZrF_4, 20 mol% BaF_2, 20 mol% NaF, 3 mol% AlF_3, 3 mol% LaF_3 and 1 mol% HoF_3. The measurements cover the spectral region from 14000 cm^{-1} to 40000 cm^{-1}. The dipole strengths of the optical transitions are given and compared with holmium ions in other matrices. The Faraday (or MCD) parameters are determined by the method of moment analysis. The most striking feature of the MCD spectrum is the dominance of the temperature dependent C terms. These reflect a significant difference in population of the Zeeman levels from which absorption of left polarized light takes place and the Zeeman levels which are starting levels for the absorption of right polarized light
The MCD spectrum is more sensitive to the local surrounding of lanthanide ions than the absorption spectrum. The symmetry dependent MCD signals allow an elimination or confirmation of some hypotheses about the site symmetry in crystalline and amorphous matrices. This is particularly relevant for the understanding of the spectroscopic properties of lanthanide doped glasses, which have valuable applications as laser host material and for optical fibers in telecommunications.



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