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Chemical Effects of $CeL_{\gamma 4}$ Emission Spectra for Ce Compounds

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High-resolution $CeL_{\gamma 4}$ emission spectra of CeF_3, Ce_2S_3, CeF_4, and CeO_2 have been measured using a multicrystal, multidetector spectrometer. The spectra exhibited substantial differences depending on the chemical environment of the Ce ions. By comparing the observed CeO_2 spectrum with the band calculations, we determined that the observed chemical effects of the main emission line were primarily attributable to the transitions of the Ce5p band; the high-energy tail at around 6.539 keV was assigned to the ligand p→Ce2s cross transition. Further, a key difference between $CeL_{\gamma 4}$ and $EuL_{\gamma 4}$ is discussed with reference to CeL_1- and EuL_1-X-ray absorption fine-structures (XAFS). Possible applications of $CeL_{\gamma 4}$ emissions to material characterization are also suggested.

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