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Local Structure and Site Occupancy in Cd- and Hg-doped CeTIn$_5$ (T=Co, Rh, Ir) C.H. BOOTH, Lawrence Berkeley National Laboratory, E.D. BAUER, F. RONNING, V. SIDOROV, T. PARK, J.D. THOMPSON, J.L. SARRAO, Los Alamos National Laboratory, A.D. BIANCHI, Z. FISK, UC Irvine — Local structure measurements using the extended x-ray absorption fine-structure (EXAFS) technique were performed from the In K, Cd K, and Hg L_3 edges on samples of CeCo(In$_{1-x}$Cd$_x$)$_5$ ($0.5\% \geq x \geq 3.1\%$) and CeT(In$_{1-x}$Hg$_x$)$_5$ (T=Co, Rh, Ir, $0.7\% \geq x \geq 3.5\%$). Fits indicate no measurable change in the bulk local structure with these substituents. In contrast, the local structure data around the substituent atoms indicates about $f_{Cd}^{Co} = 44(3)\%$ of Cd atoms reside on In(1) sites, similar to previous results [$f_{Sn}^{Co} = 55(5)\%$] for Sn in CeCo(In$_{1-x}$Sn$_x$)$_5$. Mercury has an even stronger preference for the In(1) site, with $f_{Hg}^{Co} = 71(5)\%$, $f_{Hg}^{Rh} = 97(3)\%$, and $f_{Hg}^{Ir} = 55(5)\%$, although other phases appear to be present in the CeIr(In$_{1-x}$Hg$_x$)$_5$ material. Small distortions from the parent structure are also observed around the substituent atoms. These results will be related to the sharp decrease in the superconducting transition temperature with x.

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