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Chemical substitution study on magnetism and superconductivity in $Ce_{1-x}Sm_xCoIn_5$[1] SOOYOUNG JANG, B.D. WHITE, D. YAZICI, A.S. WONG, M.B. MAPLE, Department of Physics, University of California, San Diego, La Jolla, CA 92093, USA — We have investigated the system $Ce_{1-x}Sm_xCoIn_5$ ($0 < x < 1$) by means of x-ray diffraction, electrical resistivity, specific heat, and magnetization measurements. We observe a crossover from a coherent Kondo lattice exhibiting superconductivity to a single-ion impurity Kondo effect coexisting with magnetic order on the Sm-rich side of the phase diagram. The superconducting transition temperature, T_c, and Kondo lattice coherence temperature, T_{coh}, are suppressed near $x \sim 0.2$ and $x \sim 0.5$, respectively, which is consistent with the effect of substitution with other rare-earth (RE) ions on $CeCoIn_5$. After T_{coh} is suppressed to 0 K, a single-ion impurity Kondo effect is observed for $0.5 < x \leq 0.85$. The compound $SmCoIn_5$ exhibits three distinct magnetic phase transitions at roughly 8, 10, and 12 K, which are presumably associated with magnetic order; similar features are observed in the related compound $SmIn_3$. These transition temperatures are gradually suppressed by Ce substitution and completely vanish near $x \sim 0.2$. We establish the phase diagram of the system $Ce_{1-x}Sm_xCoIn_5$ and compare our results with those obtained from chemical substitution studies of $CeCoIn_5$ involving other RE ions.

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