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**Ferromagnetism and Crystalline Electric Field Effects in Cubic $UX_2Zn_{20}$ (X=Co, Rh, Ir)** E.D. BAUER, LANL, F. RONNING, A. SILHANEK, N. HARRISON, J.D. THOMPSON, J.L. SARRAO, R. MOVSHOVICH, M.F. HUNDLEY, M. JAIME, LANL, E. DANIEL, Cidade Universitaria, C.H. BOOTH, LBNL — The properties of a new class of cubic $UX_2Zn_{20}$ (X=Co, Rh, Ir) heavy fermion compounds have been investigated by means of magnetic susceptibility, specific heat, electrical resistivity, and x-ray absorption spectroscopy. Both $UCo_2Zn_{20}$ and $URh_2Zn_{20}$ show peaks in $C(T)$ and $\chi(T)$ at ∼5-10 K suggesting the presence of crystalline electric field (CEF) effects in these materials, i.e., a localized $5f^2$ configuration of uranium. In addition, measurements in high magnetic fields up to 40 T are consistent with a CEF model of a nonmagnetic ground state and a magnetic first excited state separated by $\sim$ 20 K. In contrast, $UIr_2Zn_{20}$ exhibits a first-order ferromagnetic transition at $T_c$=2.75 K with a saturation moment $\mu_{sat}$=0.5 $\mu_B$ in the ferromagnetic state. All compounds in this series are heavy fermion materials with enhanced electronic specific heat coefficients $\gamma \sim$ 150-300 mJ/molK$^2$. The physical properties of $UX_2Zn_{20}$ (X=Co, Rh, Ir) will be discussed.

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