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Strong electron-phonon coupling in δ -phase stabilized Pu MATTHIAS J. GRAF, TURAB LOOKMAN, JOHN M. WILLS, DUANE C. WALLACE, JASON C. LASHLEY, Los Alamos National Laboratory — Specific heat measurements of the δ -phase stabilized alloy Pu_{0.95}Al_{0.05} suggest that strong electron-phonon coupling is required to explain the moderate renormalization of the electronic density of states near the Fermi energy. We calculated the specific heat contributions from the lattice and electronic degrees of freedom as well as from the electron-lattice coupling term and find good agreement between experiment and theory assuming a dimensionless electron-phonon coupling parameter of order unity, $\lambda \sim 0.8$. This large electron-phonon coupling parameter is comparable to reported values in other metals with face-centered cubic crystal structure, for example, Pd ($\lambda \approx 0.7$) and Pb ($\lambda \approx 1.5$). Further our analysis shows evidence of a small residual entropy contribution, $S_{res} \approx 0.4 \, k_B$ (per atom), which is consistent with an earlier proposed scenario that with decreasing temperature parts of the sample undergo a structural phase transformation.

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