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Low Temperature Electronic and Magnetic Properties of $CePd_3M_x$[1] STEPHEN BOONA, DONALD MORELLI, Department of Chemical Engineering and Materials Science, Michigan State University — The intermediate valence compound $CePd_3$ is a strong candidate for low temperature thermoelectric applications due to its unusually large Seebeck coefficient which peaks at approximately 115 μV/K near 125K. This phenomenon results from a sharp peak in the density of states near the Fermi level due to the hybridization of conduction electrons with those in the partially occupied cerium f-shell, thus making the system highly sensitive to changes in the average cerium valence state. We have systematically studied the structural and thermoelectric properties of various $CePd_3M_x$ compounds, where M is an s- or p-block element and $0 < x < 0.1$, in order to explore the effects of such partial filling on the cerium valence. The results of X-ray diffraction, Seebeck coefficient, and magnetic susceptibility measurements are reported. We have found that incorporating M elements of various valence configurations has similar effects on the electronic and magnetic properties as changing the M concentration, thus establishing an effective new mechanism for tailoring the thermoelectric properties of the system.

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Stephen Boona
Dept of Chemical Engineering and Materials Science,
Michigan State University

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