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Effect of chemical substitution on valence state transition in EuPd2Si2[1] MASOUD MARDANI, National High Magnetic Field Laboratory, Tallahassee, FL 32310, USA - Department of Physics, Florida State University, Tallahassee, FL 32306, USA, SHIVANI SHARMA, RYAN BAUMBACH, THEO SIEGRIST[2], National High Magnetic Field Laboratory, Tallahassee, FL 32310, USA
— $EuPd_2Si_2$ undergoes a valence state transition of $Eu^{3+} \rightarrow Eu^{2+}$ near $T_v = 142$ K in the temperature-dependent DC field magnetization measurements. In addition, the DC M-vs-T measurements show a minor shift of ≈1 K in the T_v with 6 T applied field. Furthermore, temperature-dependent powder and single-crystal XRD measurements showed that $EuPd_2Si_2$ has an anisotropic thermal expansion across T_v. To explore the effect of chemical substitution on valence state transition, doping at Pd site and Si site has been done. All the doped samples crystallize in the same tetragonal I4/mmm structure while the transition temperature moved significantly with the minimal doping of 5-10 %. The T_v moves to the lower temperature side with Ge doping at Si site while it moves toward higher side with Ni doping at Pd site which is confirmed via detailed DC magnetization measurements. Similar to the pristine sample, all the doped samples exhibit anisotropic thermal expansion across T_v.

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