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Thermal Expansion and Magnetostriction in Pr5Ni2Si3 Single crystal S.H. SONG, J.E. SNYDER, D. WU, T.A. LOGRASSO, K.W. DENNIS, R.W. MCCALLUM, Y. JANSSEN, D.C. JILES, Materials and Engineering Physics Program, Ames Laboratory, U. S. Dept. of Energy — $Pr_5Ni_2Si_3$ is the second member of the series, $R_{(n+2)(n+1)}Ni_{n(n-1)+2}Si_{n(n+1)}$, which consists of three compounds with n= 2,3 and 4 with similar hexagonal crystal structures and exhibiting uniaxial magnetic anisotropy with an easy c axis. In this study, thermal expansion and magnetostriction of $Pr_5Ni_2Si_3$ single crystals were investigated parallel and perpendicular to the easy axis over the temperature range of 5 to 300 K under applied magnetic field up to 9 T. The magnetic contribution to the thermal expansion was determined by approximating the phonon contributions to thermal expansion using the Debye-Gruneisen model. The results reflect two different magnetic phase transformations upon cooling, one corresponding to the Curie temperature (41 K) and the other exhibiting characteristics of a spin reorientation. Ames Lab. is operated for the US Department of Energy by Iowa State University under contract number W-7405-ENG-82.

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