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Superconductivity in LaRh2Sn2

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Abstract content
   (Max 300 words)
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LaRh2Sn2 crystallizes in the centrosymmetric primitive tetragonal crystal structure P4/mmm (number 123) [1] commonly referred to as the CaBe2Ge2-type which was confirmed on our synthesized samples by x-ray diffraction. The existence of this superconducting transition was published [2] and in this study we proceed with an extensive study into the properties of this superconducting ground state using physical property measurements. Electrical resistance and heat capacity measurements reveal a sharp and well defined superconducting transition TSC = 0.70 ± 0.07 K. The low-temperature heat capacity measurements show LaRh2Sn2 to be a weakly coupled [3] bulk BCS superconductor that has an s-wave singlet ground state with an isotropic energy gap 3.38 ± 0.06 meV. From the field dependence of the electrical resistance the upper critical field was estimated to be 0.127 ± 0.003 T. With the calculated penetration depth and coherence length LaRh2Sn2 is a type-II superconductor which was confirmed with low temperature magnetization measurements.

reference
[1] M. Francois et al., J. Less-Common Met. 113, 231 (1985).
[2] A. Strydom and D. Britz, J. Phys. Soc. Jpn. 81, SB018 (2012).
[3] W. L. McMillan, Phys. Rev. 167, 331 (1968).

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