

Nb S3: A unique quasi-one-dimensional conductor with three charge density wave transitions

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Abstract

© 2017 American Physical Society. We review the features of the charge density wave (CDW) conductor NbS₃ (phase II) and include several additional results from transport, compositional, and structural studies. Particularly, we highlight three central results: (1) In addition to the previously reported CDW transitions at TP₁=360K and TP₂=150K, a third CDW transition occurs at a much higher temperature TP₀≈620-650K; evidence for the nonlinear conductivity of this CDW is presented. (2) We show that the CDW associated with the TP₂ transition arises from S vacancies acting as donors. Such a CDW transition has not been observed before. (3) We demonstrate the exceptional coherence of the TP₁ CDW at room temperature. The effects of uniaxial strain on the CDW transition temperature and transport are reported.

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