Analysis of heat transport in the of iron oxyarsenide $TbFeAsO_{0.85}$

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Thermal conductivity $\kappa(T)$ of a high-quality polycrystalline $TbFeAsO_{0.85}$ sample is investigated. The $\kappa(T)$ measurement shows an anomaly in the vicinity of superconducting transition temperature ($T_c = 42.5K$). The electronic contribution to the thermal conductivity (κ_e) is estimated following Wiedemann-Franz law. The lattice contribution to the thermal conductivity (κ_{ph}) is discussed within the Debye-type relaxation rate approximation in terms of the acoustic phonon frequency and relaxation time. The theory is formulated when heat transfer is limited by the scattering of phonons from defects, grain boundaries, charge carriers, and phonons. The lattice thermal conductivity dominates in $TbFeAsO_{0.85}$ and is an artifact of strong phonon-impurity and -phonon scattering mechanism. Our result indicates that the maximum contribution comes from phonon scatters and various thermal scattering mechanisms provide a reasonable explanation for maximum appeared in $\kappa(T)$.