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A possible origin for the colossally large Seebeck coefficient in $FeSb_2$ HIDEFUMI TAKAHASHI, RYUJI OKAZAKI, ICHIRO TERASAKI, YUKIO YASUI, Department of physics, Nagoya university — Narrow-gap semiconductor $FeSb_2$ has attracted interest because of the recent observation of a colossal Seebeck coefficient $S \simeq -45$ mV/K at 10 K.[A. Bentien *et al.*, EPL 80, 17008 (2007).] This compound has a small energy gap $\Delta \sim 5$ meV and $\mid S \mid$ rapidly increases below 40 K, suggesting that Δ is formed by an unusual mechanism such as a strong electron correlation. However, the reported maximum values of S are remarkably different from sample to sample, ranging from -500 μV/K to -45 mV/K. We report a systematic study of ppm-level impurity effects of magnetic and transport properties with single crystals.[H. Takahashi *et al.*, JPSJ. 80, 054708 (2011).] A purest sample has a small carrier concentration ($< 10^{16}$ cm^{-3} below 30 K) and a large S (-1400 μV/K at 20 K), indicating that the large S predominantly comes from the small carrier density. Moreover, we have measured the magnetic field dependence of transport properties of the purest crystal to investigate the relation between the electronic states and transport properties. We successfully explain the results in terms of an extrinsic semiconductor with ppm-level impurities, suggesting that the large S arises from the low carrier concentration with a phonon-drag

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