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Substitution effects on the thermoelectric properties of Sr₂IrO₄

YANNICK KLEIN, ICHIRO TERASAKI, Waseda University, Tokyo — Layered cobalt oxides with the low-spin (LS) state, such as Na_xCoO₂ and Ca₃Co₄O₉, have shown a good potential as p-type materials for thermoelectric applications [1, 2]. Layered rhodium oxides are also characterized by a high Seebeck coefficient and a low metallic resistivity [3, 4]. The LS configuration of the transition metal is considered to be at the origin of this unusual property. We have investigated the thermoelectric properties of Sr₂IrO₄, which is isostructural to the superconductors La₂CuO₄ and Sr₂RuO₄. Contrary to the later ones, Sr₂IrO₄ is a semiconductor with a narrow gap and a weak ferromagnetic ground state ($T_c \approx 240\text{K}$, $M_s \approx 0.14\mu_B/\text{Ir}$) [5]. For polycrystalline samples, the resistivity is of the order of $10\Omega\cdot\text{cm}$ and the thermoelectric power shows a broad maximum around 110K ($S \approx 300\mu\text{V}\cdot\text{K}^{-1}$) denoting the activation of minority carriers. In order to increase the carrier concentration, we tried many substitutions for Sr and Ir. Results of resistivity, thermoelectric power and susceptibility will be discussed.

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