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**Improved thermoelectric characteristics of misfit-layered cobaltites $Ca_3Co_{4-x}Fe_xO_{9+\delta}$.**[1] CHIA-JYI LIU, LI-CHEN HUANG, WEN-CHING HUNG, Department of Physics, National Changhua University of Education, JENG-LUNG CHEN, CHING-LIN CHANG, Department of Physics, Tamkang University — We have measured the electrical resistivity, Seebeck coefficients and thermal conductivity as a function temperature for a new series of oxides $Ca_3Co_{4-x}Fe_xO_9$ (x=0, 0.05, 0.1, 0.15, 0.2) prepared by the conventional solid state reaction. Structural parameters were refined with a superspace group of X2/m(0b0)s0 using powder X-ray diffraction data. With the substitution of $Fe^{+2}$ for $Co^{+3}$, the resistivity ($\rho$) decreases, while the thermoelectric power (S) also increases simultaneously. In the low temperature regime from 15 K to 60 K, the electrical conductivity follows the Mott's law of the form $\exp[T_0/T^{-1/4}]$, suggesting the variable-range-hopping transport. The thermoelectric power also shows the same transport mechanism in the same temperature regime. The x = 0.05 sample exhibits a higher power factor value (3.3 $\mu W/K^2$-cm) than that of undoped $Ca_3Co_4O_9$ (1.2 $\mu W/K^2$-cm) at 300K, indicating the improvement of the thermoelectric characteristics upon Fe substitution for Co.

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Chia-Jyi Liu
Department of Physics, National Changhua University of Education

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