

Thermoelectric Properties of Textured $\text{Ca}_3\text{Co}_4\text{O}_9$ Prepared by Large Grain Sized Powder

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The layered-structural $\text{Ca}_3\text{Co}_4\text{O}_9$ (Co-349) exhibits promising thermoelectric properties in the viewpoint of practical use as thermoelectric power generation. For that purpose, highly grain-aligned polycrystalline bulk materials are required because of its anisotropic transport properties. Powders with different grain sizes, grown in a K_2CO_3 -KCl solvent, were used to synthesize hot-forged Co-349 compounds. Neutron diffraction experiments evidenced the effect of grain size on the development of the *c*-axis grain-alignment. The electrical conductivity in the direction perpendicular to the hot-forged axis was improved for higher degrees of orientation and larger grain sizes. Since the resistivity was reduced without deterioration of the Seebeck coefficient, the power factor of the Co-349 sample was improved.