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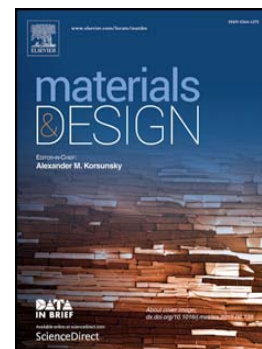
Enhanced thermoelectric power factor of $\text{Bi}_2\text{Sr}_2\text{Co}_2\text{O}_y$ thin films by incorporating Au nanoparticles

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Enhanced Thermoelectric Power Factor of $\text{Bi}_2\text{Sr}_2\text{Co}_2\text{O}_y$

Thin Films by Incorporating Au Nanoparticles

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Abstract:

c -axis oriented $\text{Bi}_2\text{Sr}_2\text{Co}_2\text{O}_y$ thin films imbedded with Au nanoparticles were prepared by pulsed laser ablation a ceramic $\text{Bi}_2\text{Sr}_2\text{Co}_2\text{O}_y$ target with a small piece of Au foil overlapped. It was found that the incorporation of Au nanoparticles, about 5-15 nm in diameter, did not disrupt the c -axis orientation of the films. Fortunately, the incorporation of Au nanoparticles decreased the resistivity of $\text{Bi}_2\text{Sr}_2\text{Co}_2\text{O}_y$ films while maintained the Seebeck coefficient almost unchanged, thus resulted in an enhanced power factor. Possible mechanisms were proposed to explain the results. This work demonstrated a promising approach to optimize the thermoelectric performance of layered cobaltite thin films.

Keywords: thermoelectric; layered cobaltite thin films; Au nanoparticles; pulsed laser deposition

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