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Observation of Spin Seebeck Effect in Bulk Strontium Ferrite

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ABSTRACT

Spin Seebeck effect (SSE) can be observed in magnetized ferromagnetic materials when subjected to a temperature gradient. In this work, the results on the SSE in the bulk strontium ferrite were demonstrated for the first time. The SSE measurement was developed in our lab and calibrated with a $Y_3Fe_5O_{12}$ standard sample. The bulk strontium ferrite was characterized for the crystal structure and magnetic properties. It was then cut, ground and polished, before the Pt film was deposited on the surface. When subjected to the magnetic field and temperature gradient, the strontium ferrite showed the SSE signal which could be measured via the inverted spin Hall effect (ISHE). The SSE voltages measured across the Pt film showed the dependence on the magnetic field, the temperature gradient, and the Pt thickness, with the maximum signal of about 200 nV/K.

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