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Application of Inelastic Neutron Scattering for Thermoelectric Materials Study

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Research on thermoelectric (TE) materials have been an active field for the past decade as TE material can potentially be used in many niche areas such as to power space probe and convert waste-heat into electricity. Continuing developments are undergoing in the search for advanced TE materials that could play significant role in sustainable technology. One of the strategies in improving the performance of a thermoelectric material is to decrease the thermal conductivity, which is directly related to the lattice dynamics of the materials. Measurement of phonon density of states and phonon dispersion as a function of temperature can provide deep insight of the thermal conductivity in terms of, for example, anharmonic vibrations and low energy rattling modes. PELICAN, a time of fight neutron spectrometer at ACNS, has been actively used for such kind of studies. In this presentation, I will give a brief introduction and the current status of TE material research, followed by the link to material lattice dynamics and explore how inelastic neutron scattering can help in fundamental understanding of the thermoelectric properties with a couple of study cases.

Level of Expertise

Expert

Presenter Gender

Man

Pronouns

He/Him

Which facility did you use for your research

Australian Centre for Neutron Scattering

Students Only - Are you interested in AINSE student funding

Do you wish to take part in the Student Poster Slam

No

Condition of submission

Yes

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