

**DEPARTMENT OF MECHANICAL ENGINEERING****SEMINAR****Online**

Title: Investigation of argyrodite-type compounds as prospective thermoelectric materials

Speaker: Mr. Dongyi Shen (PhD candidate)
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Date: 19 April, 2021 (Monday)

Time: 9:30 a.m.

Zoom Link: 1) Link to join the meeting:

<https://hku.zoom.us/j/92137602972?pwd=ZG1haXdHbzQxeHNiSjBDbW8reVhSQT09>

2) Meeting ID: 921 3760 2972

3) Password: 254187

Abstract:

Based on direct reversible conversion between heat and electricity, thermoelectric (TE) energy-conversion technology can give an attractive solution for increasingly serious environmental impact of global climate change due to the massive combustion of fossil fuels. TE energy-conversion technology possesses several unique advantages over conventional compressor-based energy-conversion technology, including compactness, no greenhouse gas emission, no noise pollution, long-time reliability in demanding environment. However, TE energy-conversion efficiency, governed by a dimensionless figure of merit $zT = S^2\sigma T / (\kappa_c + \kappa_L)$, in which S , σ , T , κ_c and κ_L are the Seebeck coefficient, the electrical conductivity, the absolute temperature, the carrier and lattice

thermal conductivity, respectively, is low, limiting the practical applications. Because transport parameters S , σ and κ_c are highly interrelated, it is difficult to improve TE performance if only optimizing one of them. Hence, suppressing the only relatively independent parameter κ_L is a straightforward strategy to boost TE performance. The concept of phonon-liquid electron-crystal (PLEC) was proposed to search for TE materials with intrinsically low κ_L induced by liquid-like ions randomly hopping in the crystal structure at elevated temperatures. In recent years, argyrodite-type compounds have attracted much attention because of their remarkable PLEC effect. This seminar will give a summary of the progress made in developing argyrodite-type TE materials, and identify scientific issues which need further investigation.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. Y. Chen at 3917 7095.

Research area: Advanced Materials