



SEMINAR

One-step construction, single material, high-strength 3D printing MWCNT micro-thermocouple

Date: 24 April, 2023 (Monday)

Time: 2:30 p.m.

Venue: Room 7-34, Haking Wong Building, HKU

Speaker: Miss Wang Zhuoran (PhD candidate)
Department of Mechanical Engineering
The University of Hong Kong

Abstract:

Recent years, thermoelectric devices (TEDs) have been widely used in measurement, power generation, and cooling due to their advantages of low pollution, low cost, and the ability to utilize waste heat. Macroscopic thermoelectric devices have achieved mature development, but there are still much space in the development of micro thermoelectric devices (μ -TEDs). Due to the high thermoelectric density of μ -TEDs and possible changes in the properties of materials at micro scales, people have begun to turn their attention to the development of micro thermocouples. Among them, single material micro thermocouples have been developed. Using size effects, metal strips with different width can obtain a Seebeck coefficient difference of 2.2 $\mu\text{V}/\text{K}$, while graphene single material thermocouple has achieved a sensitivity of up to 39 $\mu\text{V}/\text{K}$. However, above researches are only limited to the plane and does not fabricate truly three-dimensional thermoelectric devices. Here, we want to use 3D nano-printing technology to construct a single material MWCNT thermocouple, which has 5.7 $\mu\text{V}/\text{K}$ Seebeck coefficient difference. Moreover, due to the excellent mechanical properties and thermal stability of MWCNT, the constructed devices, after properly arranging the thermocouples, will have excellent flexibility and a wide range of temperature applications. This may have broader applications in wearable devices, or in high-temperature environments.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. J.T. Kim at 3917 2631.