



演題：Solution-Processable Organic Semiconductors for Electronic and Thermoelectric Application

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日時：2023年8月24日（木）14:45～16:15

場所：MC030, Faculty of Engineering

※Zoom online platform

<https://zoom.us/j/93374357079?pwd=NIJyZEIFTINjUmhGSEZ5TTRvUTVoZz09>
ID: 933 7435 7079, Pass Code: 765341

Abstract: Organic semiconductors have attracted much attention for their potential applications and commercial products such as organic light-emitting diode displays, organic field effect transistors (OFETs)-based active matrix display, and organic-based radio frequency identification (RFID) tags. Among these, solution-processable small molecules with high performance and ambient stability are of great interest due to their possibility of a low-cost solution process and high flexibility in molecular design/modification for various electronic/thermoelectric applications. In my talk, we outline the design strategies which aim to develop high performing organic semiconductor materials in the fields of OFETs and organic thermoelectrics (OTEs), a series of solution-processed thiophene-based small molecules are reported and these results indicate that OFETs semiconducting materials can be modulated through successive changes in conjugation length/side chain substituent length and molecular interaction, based on a combination of molecular design and solution-processing technique. OTEs materials can directly transform the waste heat into the electrical power without causing any pollution but their development is limited due to the poor performance especially low conductivity. Doping organic semiconductors and conjugated polymer composites are used for achieving the enhanced performance, and flexible thermoelectric generator based on these materials can be fabricated.

References:

- 1) P.-S. Lin, S. Inagaki, J.-H. Liu, M.-C. Chen,* T. Higashihara,* **C.-L. Liu,*** “The Role of Branched Alkylthio Side Chain on Dispersion and Thermoelectric Properties of Regioregular polythiophene/carbon nanotubes nanocomposites”, *Chem. Eng. J.*, **2023**, 458, 141366.
- 2) S. N. Afraj, C.-C. Lin, A. Velusamy, C.-H. Cho, H.-Y. Liu, J. Chen, G.-H. Lee, J.-C. Fu, J.-S. Ni, S.-H. Tung, S. Yau, **C.-L. Liu,*** M.-C. Chen,* A. Facchetti,* “Heteroalkyl-Substitution in Molecular Organic Semiconductors. Chalcogen Effect on Crystallography, Conformational Lock and Charge Transport”, *Adv. Funct. Mater.*, **2022**, 32, 2200880

本講演会は、大学院総合化学院『化学研究先端講義（修士課程選択科目）／総合化学特別研究第二（博士後期課程選択科目）』の一部として認定されています。

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