

Kitagawa Group Seminar on Mar. 1, 2024

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Laboratory HP: <https://www.sustainable-supramolecular-materials-lab.com/>



Seminar Time: 16:30-17:30 on March 1

Place: room 119, Research building 1

Seminar title:

Advanced Polymer Research in IMRE for Biomedical and Sustainability Applications

Abstract:

Polymers are ubiquitous in daily lives, and are an important area of development for the Institute of Materials Research and Engineering (IMRE), A*STAR, Singapore. In this talk, recent developments in IMRE's research into polymeric hydrogels for biomedical applications and sustainable upcycling of plastic waste will be discussed. In the area of polymeric hydrogels, I will discuss applications of thermogels – a unique class of temperature-responsive supramolecular hydrogel materials, which undergo reversible sol-gel phase transition when warmed. Specifically, thermogels are poised to be a transformative technology in ophthalmology and drug delivery, potentially leading to new treatment modalities. In the second part of my talk, I will describe how our recent research aims to address the global plastic crisis through sustainable chemical upcycling. Through this approach, abundant and low-cost waste plastics are used as feedstock and chemically upcycled into useful chemicals and functional polymeric materials of higher economic value, which can incentivize development of circular materials economy. The use of MOFs as an important enabling technology in both these emerging areas of research will be discussed. This will include how they can be exploited for sustained release of drugs simultaneously at different rates for potential multi-drug therapy, as well as catalysts for conversion of plastics into valuable small molecule chemicals.