Mar 23rd, 9:00 AM - 10:20 AM

Increasing Stretchability of Conjugated Polymers Using Metal-Ligand Coordination

Kacper Wojtkiewicz
University of Windsor, wojtkie@uwindsor.ca

Stretchable and mechanically robust materials are now becoming crucial for the development of wearable electronics. In particular, semiconducting conjugated polymers have been shown to be remarkable candidates for the preparation of new electronic devices due to their good charge transport properties, synthetic versatility and easy tunability. Among the various strategies developed in recent years towards such materials, the use of dynamic crosslinking, especially metal-ligand interactions, is a promising avenue to prepare and design stretchable materials while also enabling novel properties such as self-healing. However, many challenges remain to achieve stretchable conjugated polymers, due to the intrinsic competition between electronic and mechanical properties.

The objective of the project is to develop a novel strategy towards making intrinsically stretchable and self-healing conjugated polymers for application in stretchable electronics. This main objective will be achieved by incorporating metal coordinating moieties, namely imine side-chains, to the polymer in order to chelate to Iron(II). This dynamic coordination will allow for the polymer network to dissipate strain, thus enhancing the mechanical properties of the materials. Moreover, this will also allow for regeneration of the polymer network after damage known as self-healing. This presentation will discuss our recent progress toward new metal-coordinating conjugated polymers, especially focusing on their design and preparation.