Center for Molecular Spectroscopy and Dynamics, IBS-Korea University

IBS Center for Molecular Spectroscopy and Dynamics

Seminar

- **SPEAKER**
  Prof. Yongju Kim (KU-KIST Graduate School of Converging Science & Technology)

- **TITLE**
  Adaptive Supramolecular Nanomaterials: Functional Tubules and Enantiomer Sieving Sheets

- **ABSTRACT**
  Molecular assembly forms diverse supramolecular architectures through non-covalent interactions which can be changed reversibly by external stimuli such as temperature, light, salt, and pH. I present the switchable assembly by adjusting non-covalent interactions for 1D tubules and 2D porous sheets. For example, dynamic tubular pores undergo rapid switching between open and closed states in response to a thermal signal in water. Notably, this pore switching mediates a controlled water-pumping catalytic action for the dehydration reaction (Fig. 1a). A virus-like hierarchical assembly with the native DNA and a synthetic coat shows repeated collective helicity switching triggered by pH change. This collective helicity inversion occurs during translocation of the DNA–coat assembly into intracellular compartments. Translating DNA conformational dynamics into a higher level of hierarchical dynamics may provide an approach to create DNA-based nanomachine (Fig. 1b). Homochiral porous nanosheets are presented with open-closed pore switching. The porous 2D structures can serve as enantiomer sieving membranes which exclusively capture a single enantiomer in a racemic mixture solution with high uptake capacity. The entrapped guests inside the pores can be pumped out by pore closing triggered by salt (Fig. 1c). Moreover, I also present supramolecular concepts to translate the adaptive nature of biological systems into synthetic self-assembly.

- **DATE AND VENUE**
  April 10, 2019 (Wednesday, 5:00 - 6:00 pm)
  Seminar Room A (116), KU R&D Center

- **LANGUAGE**
  Korean

- **INVITED BY**
  Professor Kyungwon Kwak