

המעבדה לכימיה אורגנית ואי-אורגנית

סמינר

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בנושא:

Metallopolymer-based Anion-Exchange Membranes for
Fuel Cell Applications

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Abstract: Anion-exchange membrane fuel cells (AEMFCs) are promising energy conversion devices due to their high efficiency and relatively low cost. Nonetheless, current anion-exchange membranes (AEMs) degrade rapidly in the dry alkaline conditions in operating fuel cells, and, as a consequence, AEMFCs are not yet practical. In recent years, metallopolymers have been proposed as a chemically stable alternative to traditional organic electrolytes based on quaternary ammonium salts, where the metal centers assume the ion transport function.[1,2] Yet, the few metallopolymers tested in strongly alkaline conditions or even in fuel cells still degrade.[3] Therefore, fundamental studies to understand the structure-function relationship of metallopolymer-based AEMs are necessary for guiding future developments towards practical AEMFCs. In this seminar, I will present the investigation of four molecular parameters in metallopolymers focusing on how each affect the overall alkaline stability: Metal center oxophilicity;[4] ligand valency;[5] stereo-electronic properties of N-heterocyclic carbene (NHC) ligands; and finally, monomer chemistry. The conclusions from these studies provide a scientific base to judiciously design metallopolymers as AEMs for AEMFCs.

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