הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסה כימית
ע"ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Special Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday October 25th at 1:30pm

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Chemical Engineering, Technion

Water absorption isotherms and kinetics of anion exchange membranes for fuel cell applications

Anion-exchange membrane fuel cells (AEMFCs) have attracted extensive attention during the past decade, primarily due to the distinct advantages they have over the mainstream proton-exchange membrane fuel cells. Anion exchange membranes (AEMs) are the key component of AEMFCs. Understanding AEM hydration is important due to its influence on membrane conductivity and stability, with impact on the overall cell performance. In this work, we studied the equilibrium and dynamics of water uptake (WU) of AEM from water vapor. AEMs with different chemistries (in both backbones and functional groups) were investigated. Equilibrium WU isotherms on the selected AEMs were measured and fitted by Park's model. The influence of relative humidity (RH), temperature and counter ions was studied for both equilibrium and dynamic WU. Characteristic time constant was used to describe WU kinetics during absorption process. Based on this, possible absorption mechanisms at different RH ranges for all the examined membranes were proposed. To the best of our knowledge, this is the first water absorption kinetics study on AEMs that combines equilibrium and kinetic data to describe WU from vapor. Results of this study are critical to increase the understanding of the water-AEM interaction inside the fuel cell. Likewise, these new insights may now provide guidelines for membrane development for AEMFC applications.

Refreshments will be served at 1:15pm