

סמינריון

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות בשיתוף עם תכנית האנרגיה בטכניון שתתקיים ביום ה' 15.11.2018 (ז' בכסלו, תשע"ט), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה : אלעד כלפון

מנחה : פרופ"מ מתיו סאס

על הנושא :

High Conductivity Dual Operation Mode Flow Electrode Towards next-generation energy storage devices

The seminar will be given in English

תקציר ההרצאה :

Electrochemical flow systems for energy storage and water desalination such as redox flow batteries (RFBs) and capacitive deionization (CDI) cells, employ either static electrodes or flowable suspension electrodes. Static electrodes are often electrode particles held together by polymeric binder while flowable electrodes are flowing suspensions of conductive particles in an electrolyte. Flowable electrodes enable important functionalities not available to static electrodes, such as continuous water desalination in capacitive deionization, dendriteless metal deposition and decoupling energy from power for flow batteries. But, flowable electrodes suffer from often orders of magnitude lower electric conductivity than static electrodes, and are typically order 1 mS/cm, which can be lower than the electrolyte ionic conductivity.

To combine the benefits of both static and flowable electrodes, we proposed and demonstrated an electrode which can be switched between a flow-through static mode and a flowable mode in operando. We provide first-time measurements of the electrode's electric conductivity as it undergoes velocity cycling and transitions between modes. The electrode achieves a gigantic conductivity of over 10,000 mS/cm while in static mode, and demonstrates repeatable switching between static and flowable modes at a tunable transition velocity. Hysteresis in the forwards and backwards velocity scans and electrolyte effects point to an important role of interparticle forces on the electrode's performance. The switchable electrode introduced here can in the future enable novel, highly versatile electrochemical systems.

בברכה,

ד"ר איתן סאס

מרכז הסמינרים