

תכנית האנרגיה ע"ש גרנד מתכבדת להזמין להרצאה סמינריונית שתיתן ע"י:

אלון עוז

התכנית הבין-יחידתית לאנרגיה

בנושא:

Novel approach to analyze impedance spectroscopy of electrochemical power sources

Electrochemical impedance spectroscopy (EIS) is one of the most celebrated characterization techniques to unfold the nature of complex electrochemical systems such as a supercapacitors, fuel-cells and batteries. It utilizes the fact that the polarization losses of the tested sample differ in their characteristic time constant and frequency response. When an electrochemical system is subjected to a potential difference, polarization of charges takes place. Upon reversing the potential, each interface in the cell will react differently and therefore can be detected at a different characteristic frequency (or reciprocal time). In that manner, the unique response of each interface can be separated and analyzed. Thus, given a proper analysis technique, making EIS a powerful, comprehensive and nondestructive electrical characterization method of electrochemical systems.

In this work, a novel approach to analyze EIS has been developed and implemented on electrochemical power sources. Impedance Spectroscopy Genetic Programming (ISGP), which serves as the cornerstone of our analysis approach, utilizes evolutionary programming to find the most suitable distribution function of relaxation times (DFRT). The analysis yields a DFRT model comprised of linear combination of peaks. Each peak in the model has its own characteristic relaxation time and area, and can be assigned to one or more processes in the tested sample. By plotting the DFRT as a function of frequency and monitoring the changes in each peak's relaxation time and area at different conditions, we are able to distinguish how each process resistance influence the overall polarization resistance of the tested sample.

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במסגרת עבודת מחקר לתואר דוקטור

ההרצאה תתקיים ביום ד', 27/12/17, בשעה 9:30, אולם 6, הפקולטה להנדסה כימית