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

Wolfson Department of Chemical Engineering Seminar
Wednesday, June 23rd, 2021, at 13:30
Lecture Hall No. 6

Degradation of PEMFC cathode due to NO contamination, studied by Distribution of Relaxation Times analysis

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M.Sc. Seminar

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A polymer electrolyte membrane fuel cell (PEMFC) is an environmentally friendly energy converter with many advantages, including low operating temperatures (70-100 °C), high power density (~1.4 kW/kg), high electrical efficiency (40-60%), and quiet operation. However, PEMFC commercialization is still hampered by cost and durability issues. The contamination of PEMFCs by impurities in feed streams is a significant contributor to durability issues. As a result, PEMFC technology development still necessitates intensive R&D.

In PEMFC research, EIS has been an indispensable diagnostic tool. An essential benefit of EIS is the ability to determine the total impedance from various components or processes within a PEMFC. To identify contributors correctly, it is necessary to analyze EIS data reliably. We have used the Impedance Spectroscopy Genetic Programming (ISGP) technique as an analysis tool to accomplish this.

In the presented research, PEMFCs were operated under heavy NO cathode contamination levels, and *in operando* EIS measurements were performed. The data were analyzed using ISGP based on a previously obtained model, revealing the impact of NO cathode contamination on each of the main processes within a fuel cell. A strategy to partially alleviate the damage caused by NO contamination is also suggested.

Refreshments will be served at 13:15