



Wolfson Department of Chemical Engineering Seminar
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Online seminar via Zoom

<https://technion.zoom.us/j/95988816357>

**Water effect on the oxygen reduction reaction for anion
exchange membrane fuel cells**

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Anion exchange membrane fuel cells (AEMFCs) is one of the most reliable, efficient technology that can potentially revolutionize energy storage and delivery; however, their commercial development is hampered by the chemical decomposition of the anion exchange membranes during operation. It requires proper water management since the oxygen reduction process consumes a lot of water, which can cause serious damage to the membrane, especially on the cathode side when there is a lack of water. Low water concentrations at the cathode in an AEMFC lead to the formation of hydroxides with low water solvation, which increases the cathode's nucleophilicity and speeds up the kinetics of degradation, even of ionomers that are typically 'stable' in strong alkaline solutions. Therefore, it is crucial to understand the role of water on oxygen reduction reaction (ORR) to get better insight into the membrane degradation mechanism. Herein, we will explore water's effect on the electrocatalysts at the cathode side, and the intrinsic mechanism of the ORR reaction in low water content environments, which might help to solve the drying problem of cell cathode.