

## **In Situ Water Sensing in a Nafion Membrane by Fluorescence Spectroscopy**

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The objective of this work is to use fiber-optic fluorescence spectroscopy to detect changes in the Nafion membrane water content in a fuel cell at several operating conditions. The fluorophore Rhodamine 6G was found to be sensitive to the membrane water content. The fluorescence measurement of the membrane water content predicted the dynamic response of the fuel cell during startup, during operating condition changes, and during many small perturbations. A decrease in the membrane water content was observed as the fuel cell current was increased. The decrease in the water content is attributed to mass-transfer limitations at the anode side of the membrane.