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In Operando Raman spectroscopy for investigation of solid oxide electrolysis cells

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Raman spectroscopy is an optical, vibrational spectroscopy well suited for in operando investigations, as the technique can be applied at the temperatures and gas pressures used during operation of solid oxide electrolysis cells.

For this reason DTU Energy has invested in a Raman lab dedicated to in operando investigation of solid oxide electrolysis cells and other electrochemical systems.

In operando monitoring of carbon depositions in a Ni-YSZ cell
The carbon deposition in 50\% CO/50\% CO\textsubscript{2} at 750 °C was followed on a symmetric Ni-YSZ cell mounted vertically in the test-house to allow for monitoring of the electrochemically active region.

Reversible Decomposition of Secondary Phases in BaO Infiltrated LSM Electrodes—Polarization Effects
Compositional changes in BaO-modified lanthanum strontium manganite (LSM) electrodes where observed during electrical polarization. The applied cathodic potential resulted in a reversible decomposition of a secondary Ba\textsubscript{3}Mn\textsubscript{2}O\textsubscript{8} phase

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Raman shift [cm\textsuperscript{-1}] Assignment
306 Ba\textsubscript{3}Mn\textsubscript{2}O\textsubscript{8} 
610 MnO\textsubscript{4} 
644 Mn\textsubscript{3}O\textsubscript{4} 
773 Ba\textsubscript{3}Mn\textsubscript{2}O\textsubscript{8} 
1051 MnO/BaCO\textsubscript{3} 

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