Summary
Cobalt-doped barium cerate-zirconate perovskites displaying both catalytic and mixed-conducting properties for high-purity hydrogen extraction from methanol have been synthesized and analyzed to verify crystal phase, structure, surface morphology and composition. Catalytic activity of resulting electroceramic for oxidative reforming of methanol has been investigated, and ongoing impedance-spectroscopy analysis have made strides in quantifying both ionic and electronic conductivities of the material. These findings support continued investigations of coupled catalytic hydrogen production and electrochemical purification using these novel materials.

Yields for methanol partial oxidation approach 100% for hydrogen production.

Impedence Spectroscopy at 600°C suggests mixed ionic-electronic conductivity for hydrogen separation.