Characteristics of the YSZ Oxygen Sensor in a Water Content Atmosphere at Elevated Pressures

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A YSZ oxygen sensor responded correctly to changes in oxygen concentration in an autoclave chamber, although at elevated pressures, the electron transfer numbers agreed well with the theoretical value of 4. The electrochemical impedance spectra (EIS) of the sensor at an oxygen concentration of 500000 ppm, a temperature of 873 K and pressures of 1-80 atm were determined, and those results demonstrated that the overall electrode resistances were strongly dependent on the pressure of the system, which was probably due to the change of physical and chemical characteristics of the working medium. This result is consistent with the strong impact of pressure on the response rate of the oxygen sensor working in a water content atmosphere at elevated pressures.

Keywords: YSZ oxygen sensor, water content atmosphere, elevated pressures, electrochemical impedance spectra

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