Conductivity study of dense BaZr0.9Y0.1O(3 − δ) obtained by spark plasma sintering

10% yttrium doped barium zirconate (BZY10) was synthesized by solid state reaction and a 99.8% dense and transparent sample was prepared by spark plasma sintering (SPS) at 1700 °C for 5 minutes. A single phase compound was obtained, with no evaporation of barium. High-Resolution Transmission Electron Microscopy (HRTEM) images revealed a distinct grain boundary across two grains, confirming no secondary phase formation along grain boundaries. The conductivity was determined as a function of temperature, at two different water vapor pressures, as well as in the D2O vapor exchanged state. The activation energy corresponding to protonic conduction has been determined, and compared to values from literature. The decrease in activation energy with increasing lattice parameters is confirmed. Furthermore, the effective space charge layer width has been estimated at 1.2–1.3 nm.