Supporting Information

Homogeneous Grain-Controlled ScSZ Functional Layer for High Performance Low-Temperature Solid Oxide Fuel Cells

*Soonwook Hong, Jonghyun Son, Yonghyun Lim, Hwichul Yang, Fritz B. Prinz, and Young-Beom Kim**

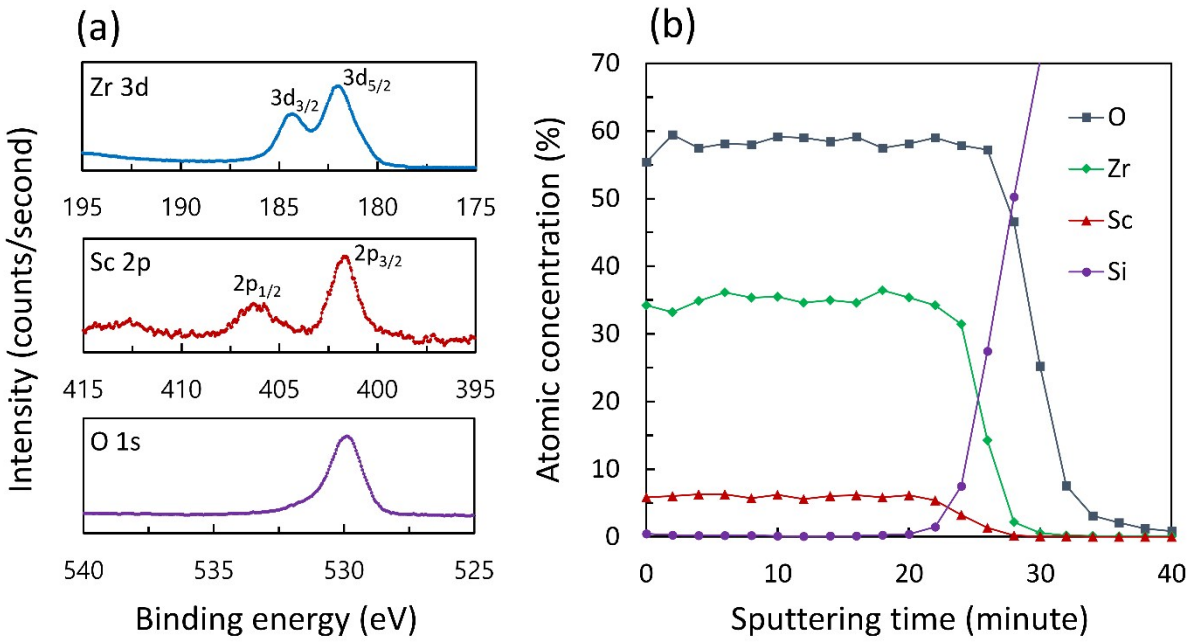

Fig. S1 (a) Representative XPS spectra of Zr 3d, Sc 2p and O 1s and (b) XPS depth profile of Zr, Sc O and Si for the fabricated 10 mol% ScSZ thin film grown on Si wafer.

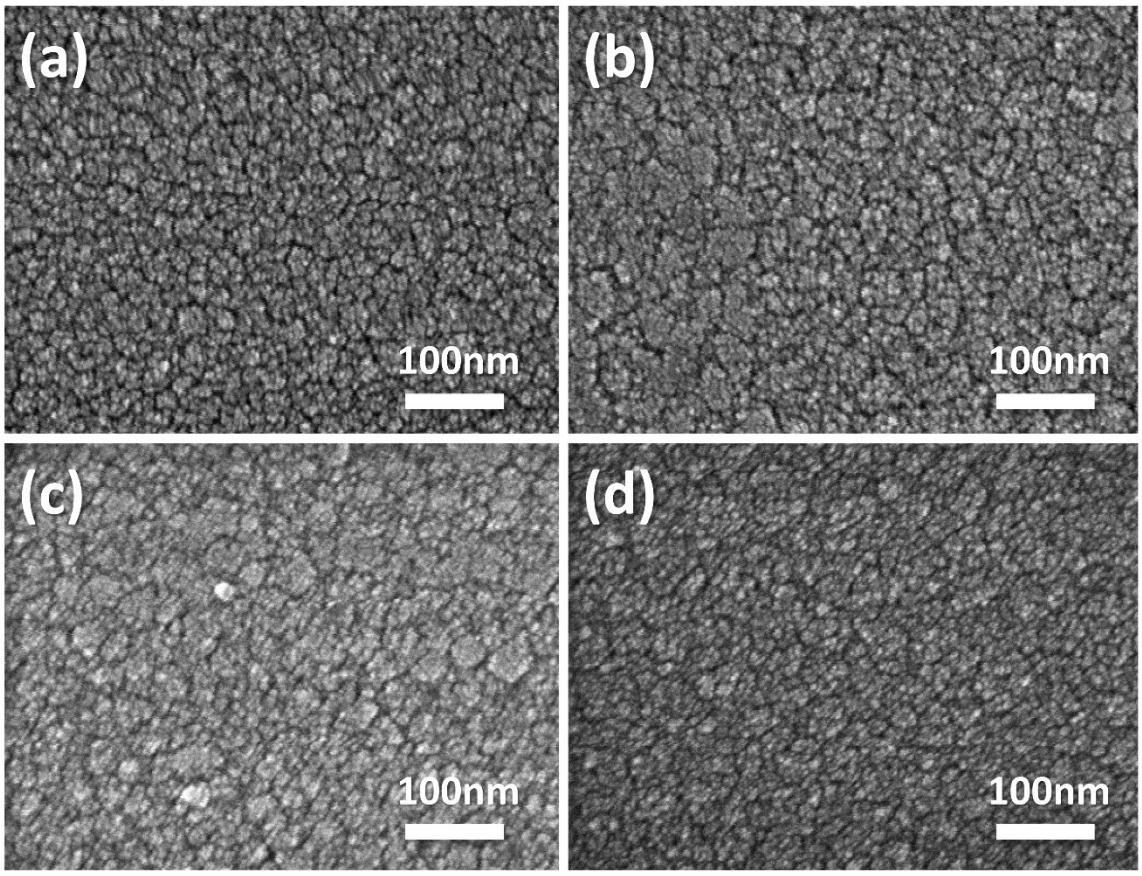

Fig. S2 SEM micrographs of 100-nm-thick ScSZ thin films deposited on silicon substrate with (a) 40 W, (b) 80 W, (c) 120 W and (d) 160 W of RF plasma power.

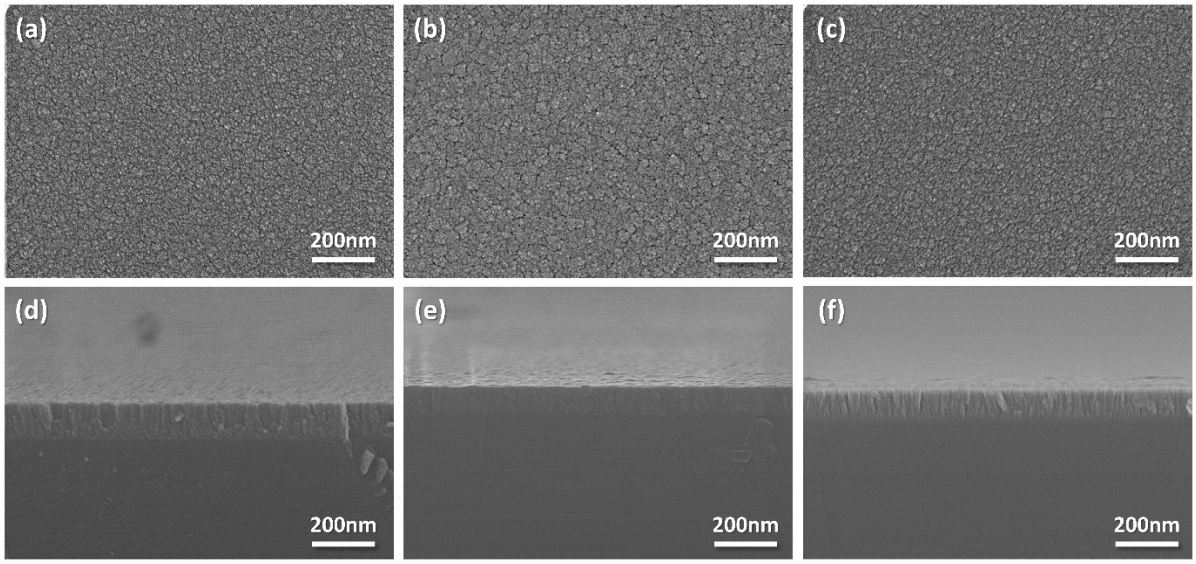

Fig. S3 SEM micrographs of 100-nm-thick ScSZ thin films deposited on (a, d) silicon substrate, (b, e) alumina and (c, f) YSZ substrate with 120 W RF plasma power.

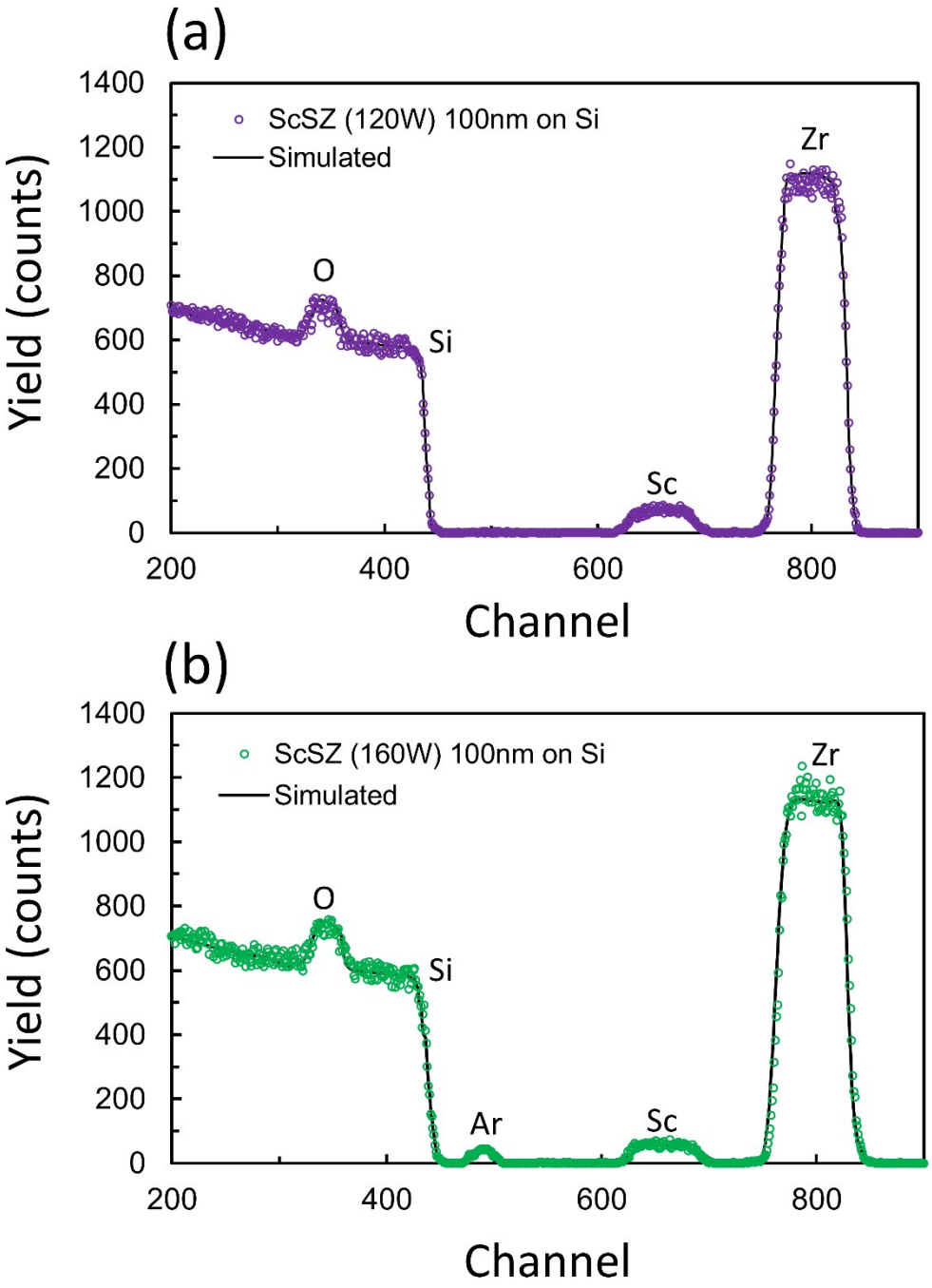

Fig. S4 The experimented and simulated RBS spectra of the ScSZ thin films fabricated under (a) 120 and (b) 160 W RF sputtering power. Argon element is observed in ScSZ thin film grown in 160 W sputtering condition.

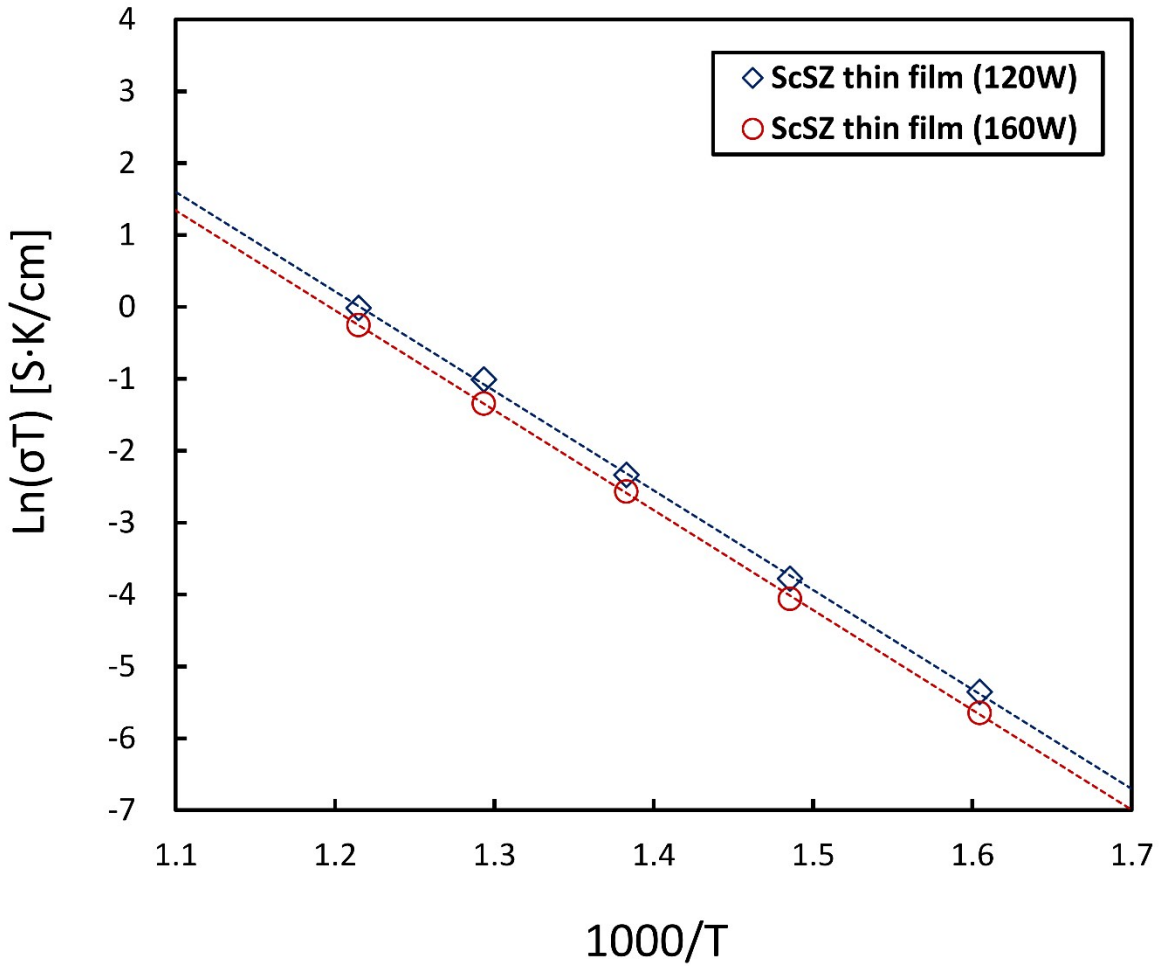

Fig. S5 Ionic conductivity measurement of ScSZ thin films with different RF power condition.

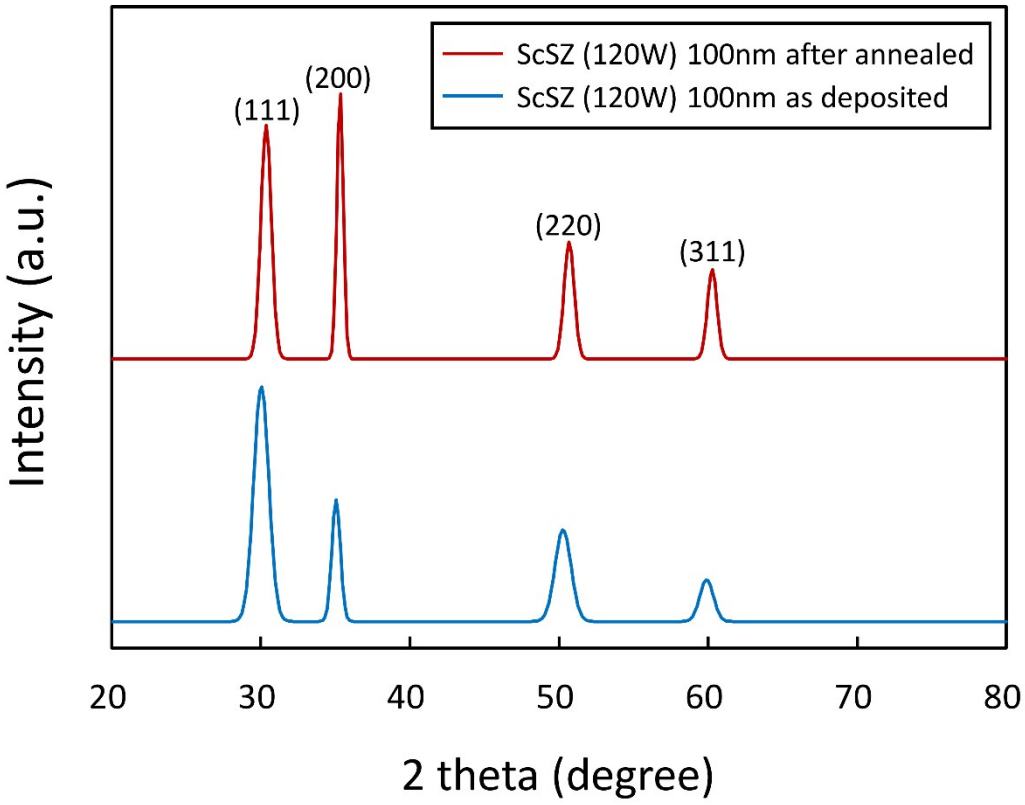

Fig. S6 XRD patterns of ScSZ thin films grown under 120 W power condition on Si wafer before and after annealed with fuel cell operation temperature (450 ^{o}C).

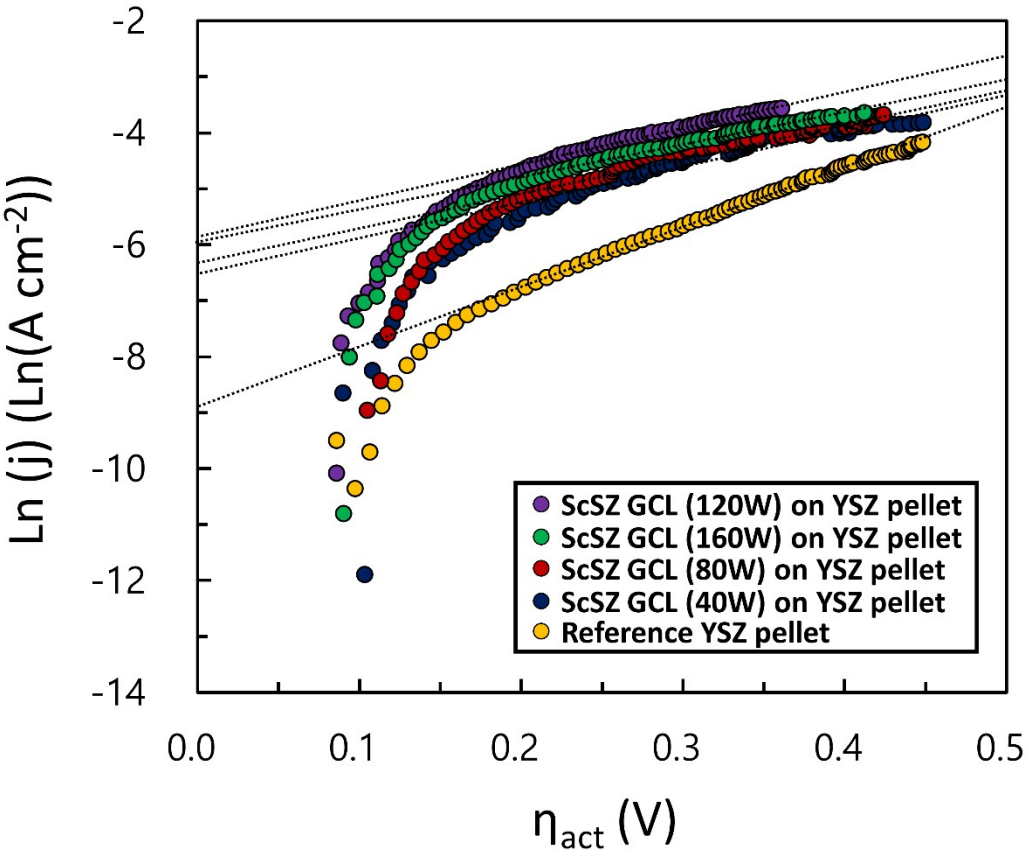

Fig. S7 Tafel plots of ScSZ GCL on YSZ pellets with various RF sputtering power.

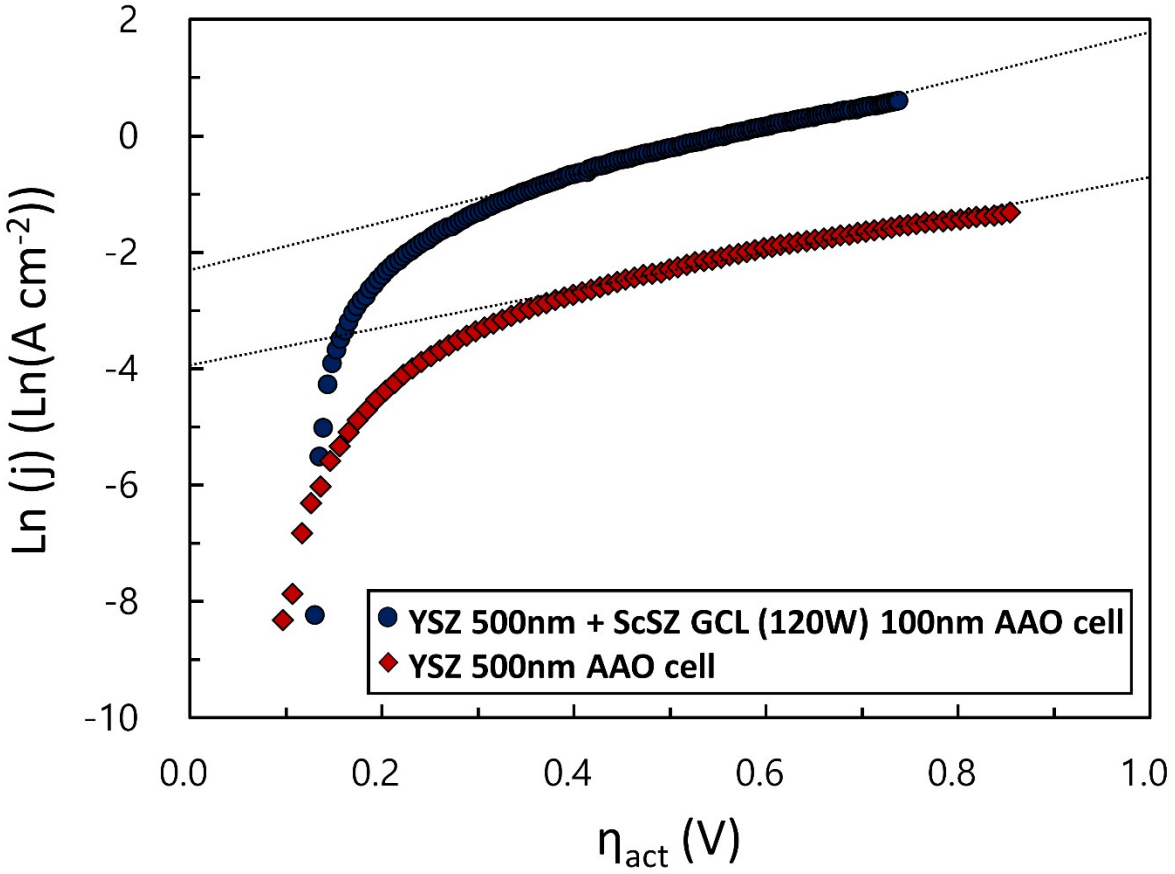

Fig. S8 Tafel plots of 100-nm-thick ScSZ GCL (120 W) on cathode side of a 500-nm-thick YSZ electrolyte supported by AAO substrate.