

Supplementary material

Unraveling the Role of Si and Al Impurities in Ni/YSZ Fuel Electrode Degradation in Solid Oxide Electrolysis Cells

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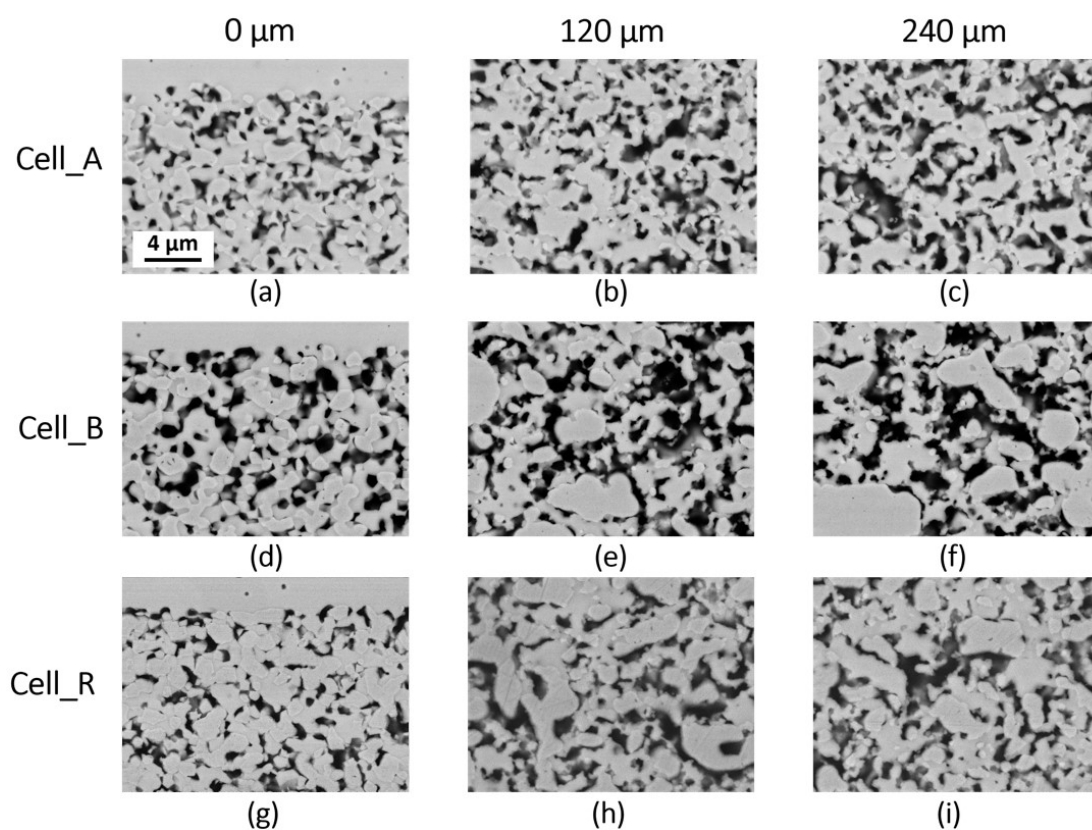


Figure S1. The SEM micrographs of the cross section of (a)-(c) Cell_A, (d)-(f) Cell_B and (g)-(i) Cell_R. All the images were taken at the gas-inlet side of the cells. The locations of the SEM images were recorded at different distance from the electrolyte/electrode interface in fuel electrode: (a, d, g) 0 μm, (b, e, h) 120 μm, and (c, f, i) 240 μm.

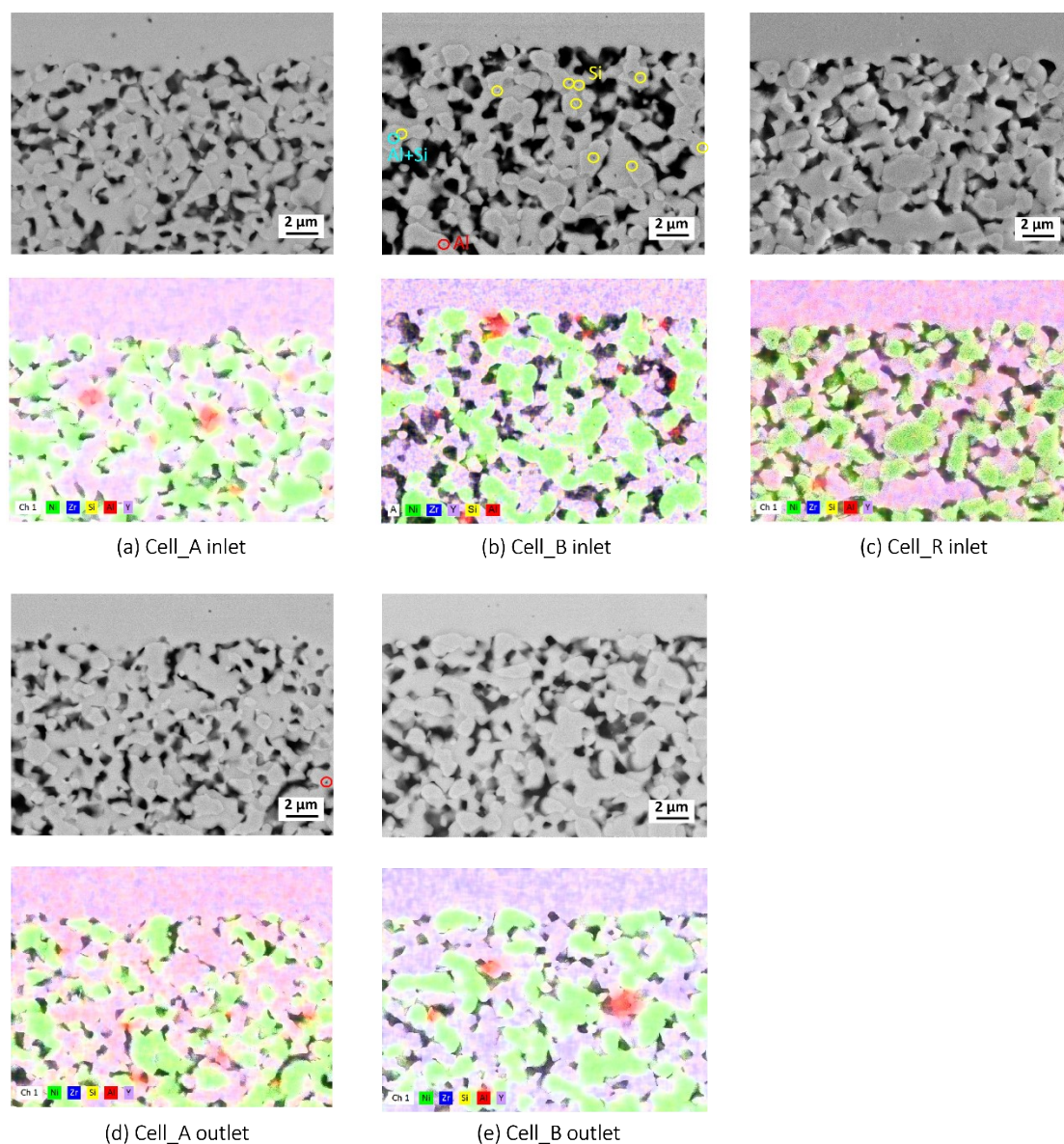


Figure S2. The SEM micrographs, mapping and point analysis of the cross section of Cell_A, Cell_B and Cell_R at gas inlet and outlet. The locations of the SEM images were recorded at the fuel electrode/electrolyte interface.

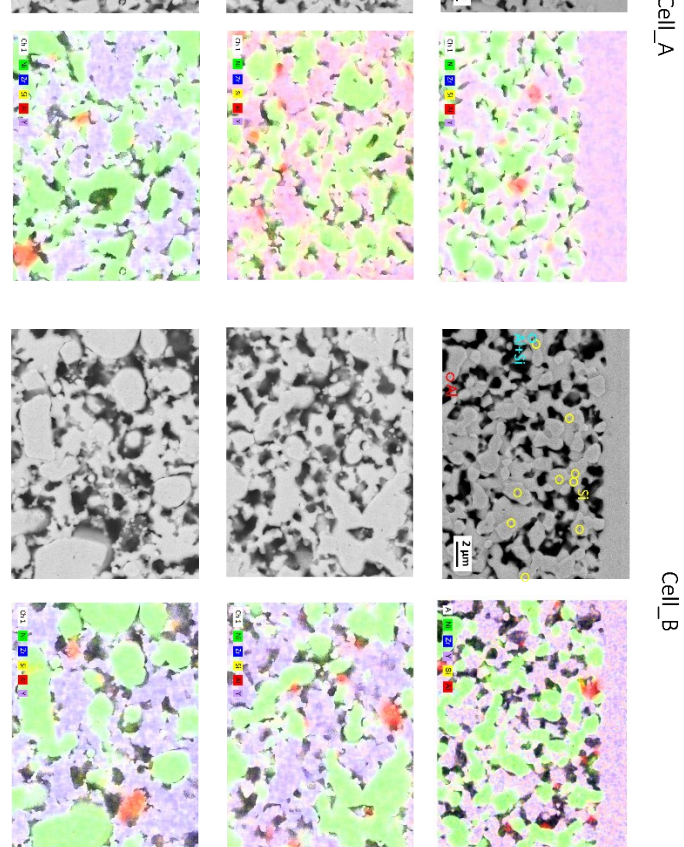


Figure S3. The SEM micrographs, mapping and point analysis of the cross section of Cell_A, Cell_B and Cell_R gas inlet. The locations of the SEM images were recorded at different distance from the electrolyte/electrode interface in fuel electrode: 0 μm , 120 μm , and 240 μm .

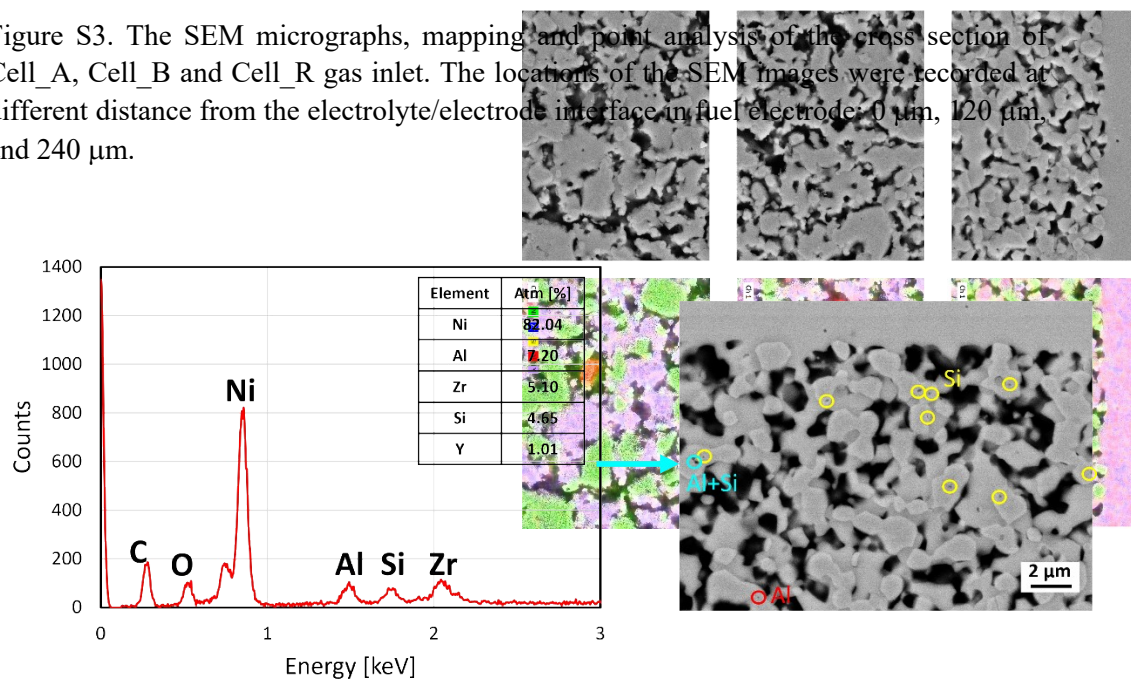


Figure S4. An example of EDX results of point analysis in Cell_B inlet at electrode/electrolyte interface, and the location is indicated on the SEM image.

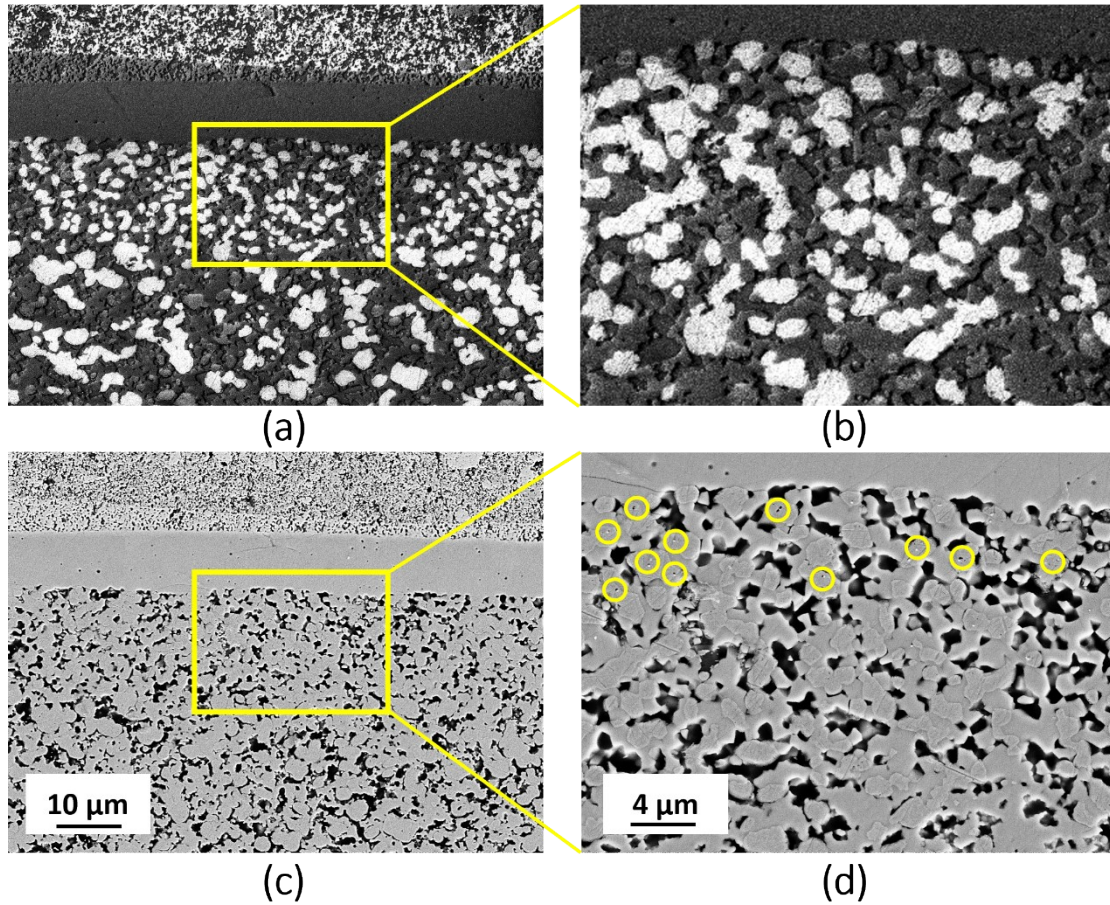


Figure S5. Comparison of percolated Ni images (a–b) and SE2 images (c–d). (b) and (d) are magnified views of (a) and (c), respectively. Yellow circles in (d) indicate locations where Si was detected by EDX analysis.

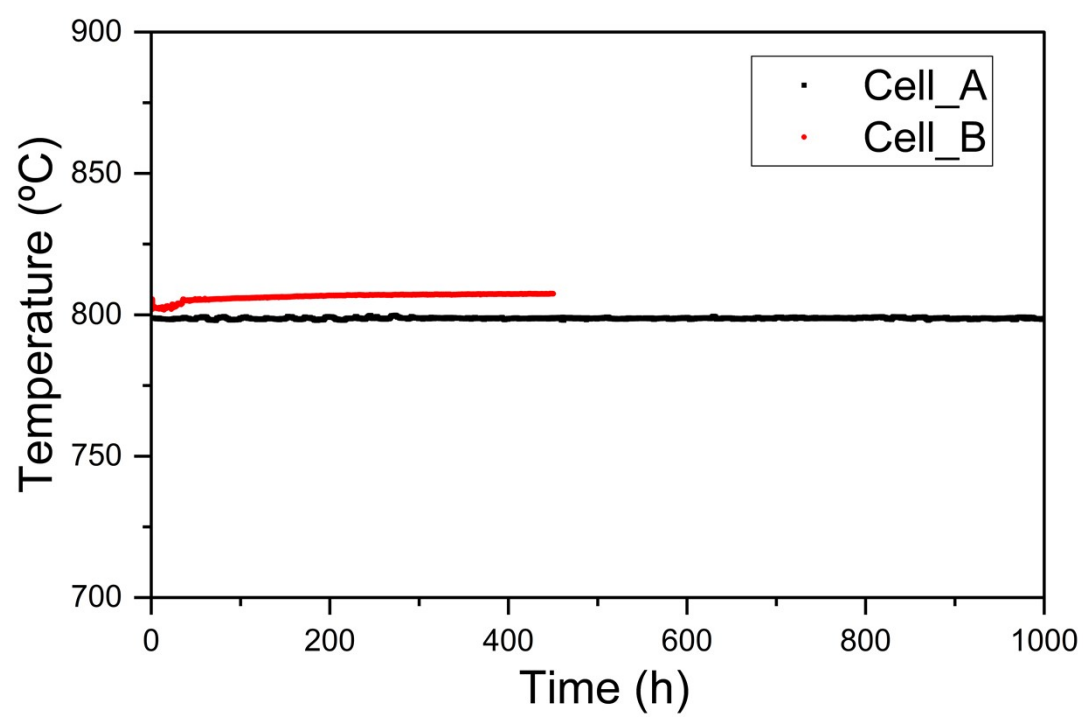


Figure S6. Operation temperature of Cell_A and Cell_B throughout the degradation tests.