

## Supporting Information

### **Direct deposition of dense YSZ/Ni-YSZ thin-film bilayers on porous anode-supported cells with high performance and stability**

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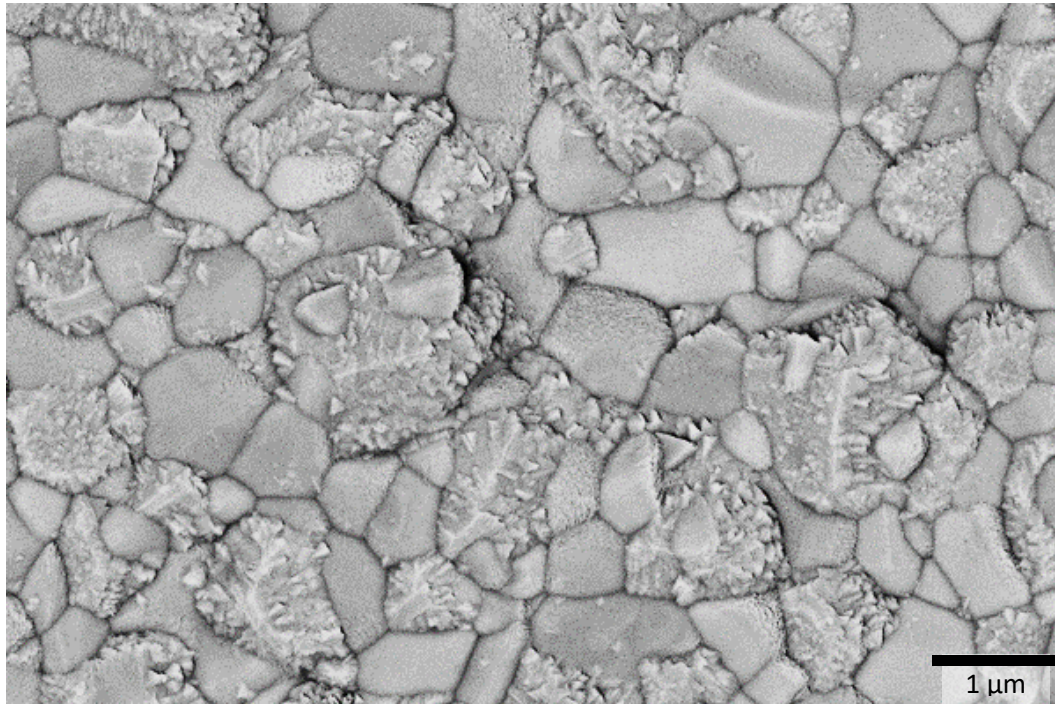
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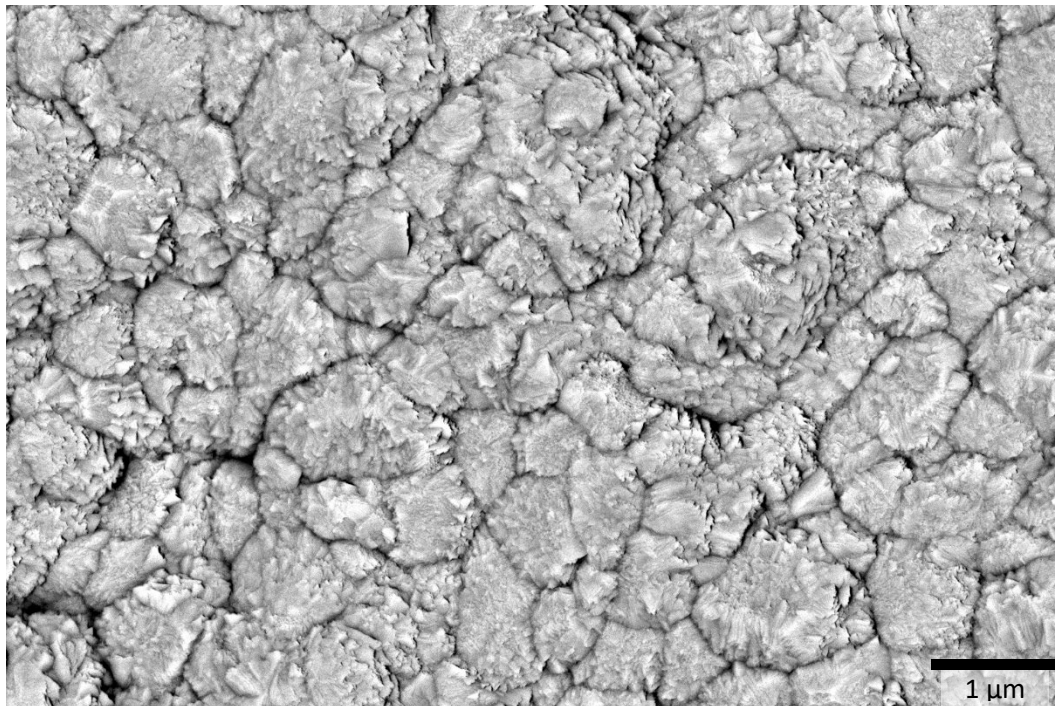
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(a)



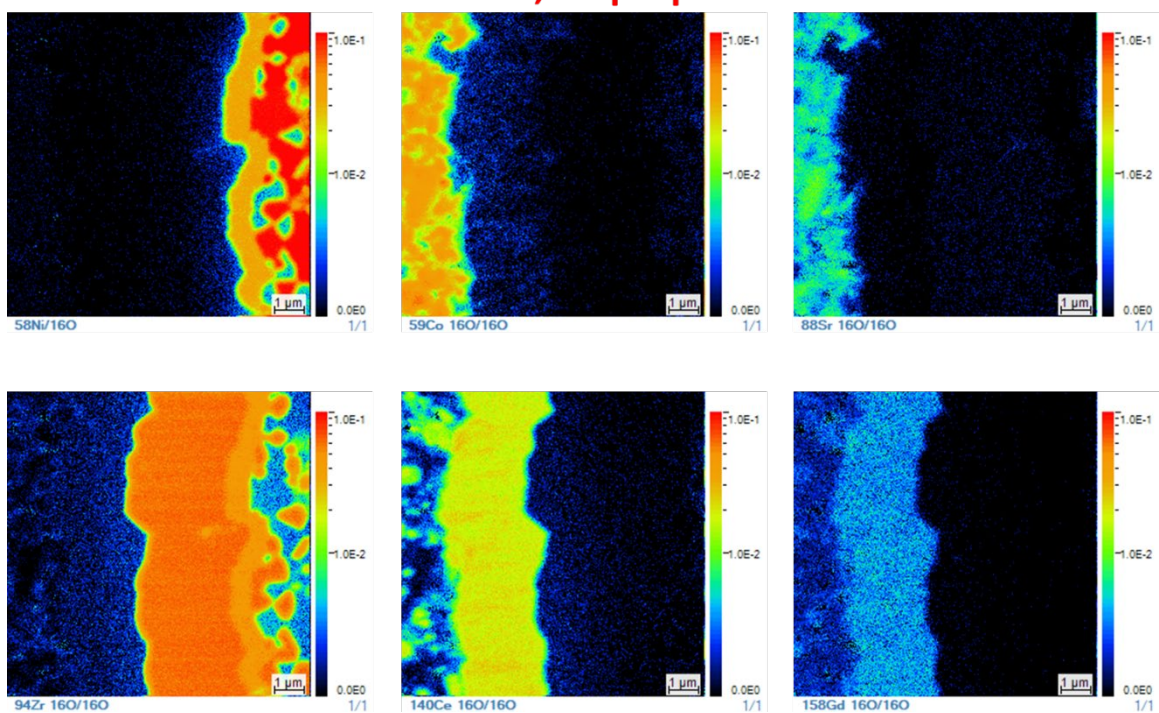
(b)



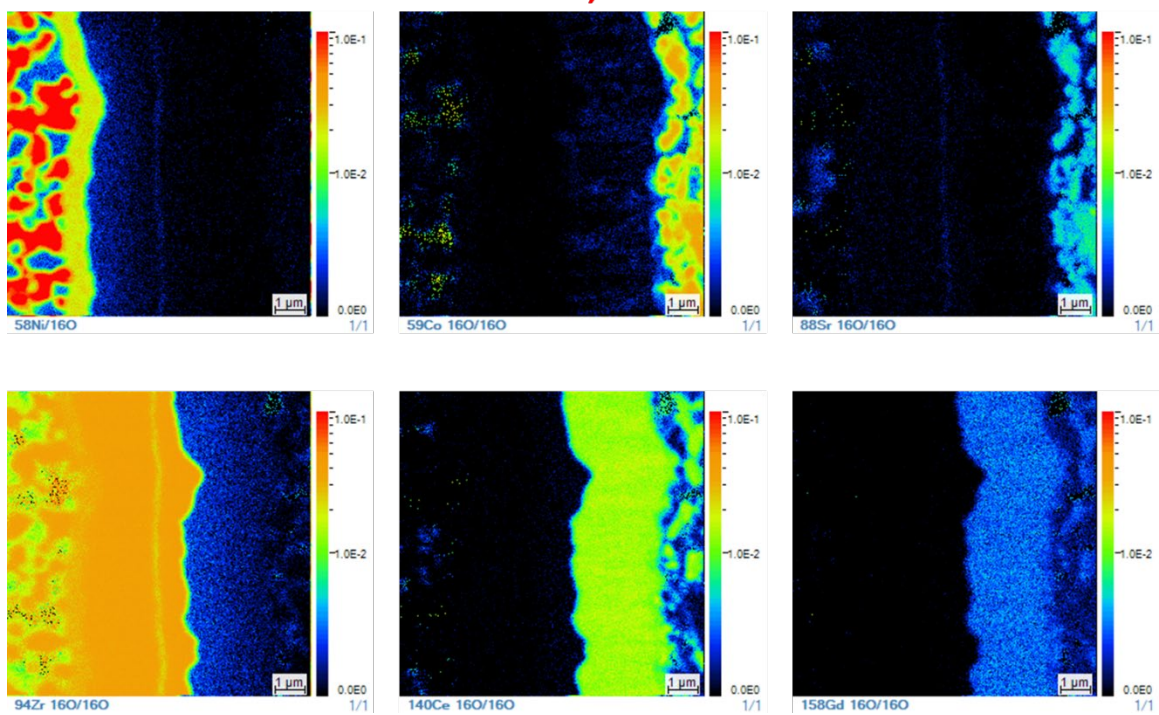
**Figure S1.** Typical plan-view SEM images depicting the YSZ thin film surface morphologies deposited on AFL/anode-supported cells a) without and b) with NiO-YSZ nanocomposite layer. Without the NiO-YSZ nanocomposite layer, YSZ grains exhibit a bimodal grain distribution, i.e., less homogeneous layer.



## PLD-YSZ, as-prepared

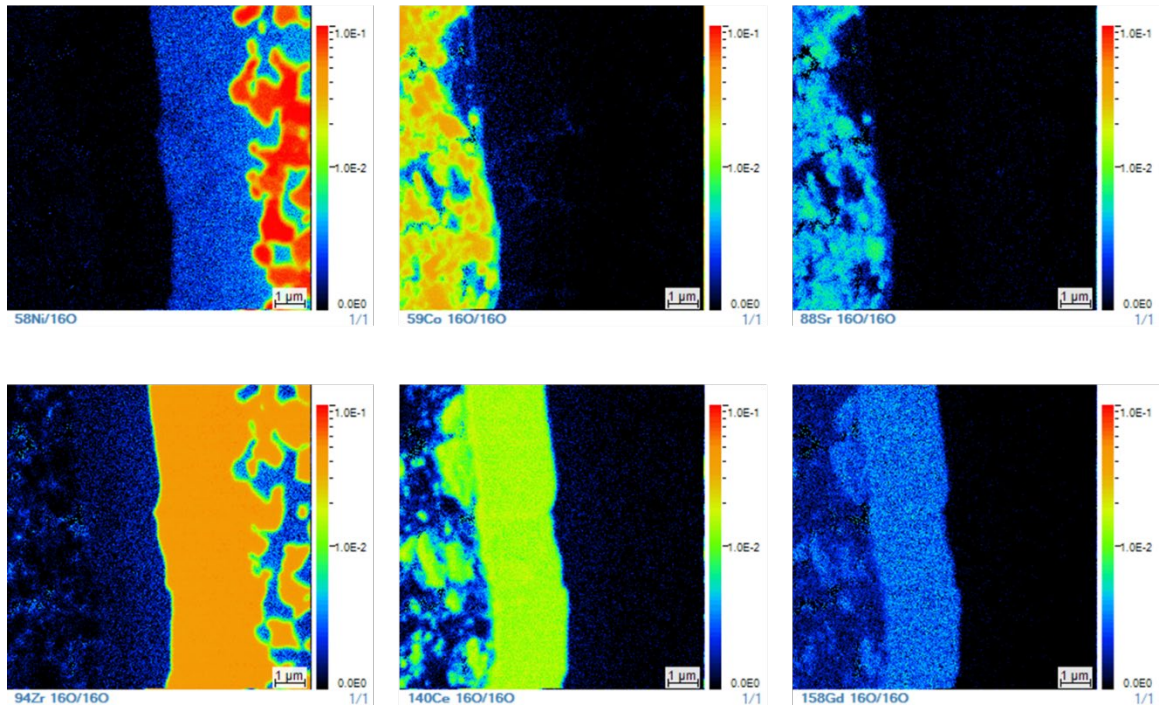


## PLD-YSZ, tested

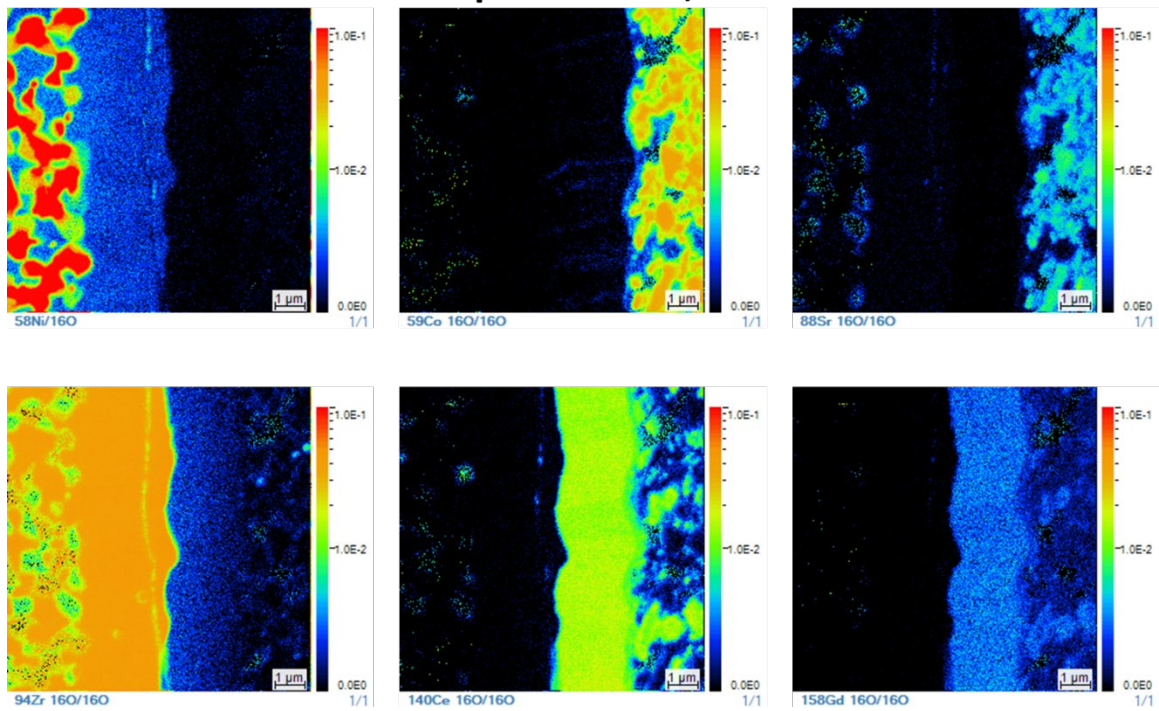


**Figure S2.** SIMS elemental mapping of  $^{58}\text{Ni}$ ,  $^{59}\text{Co}^{16}\text{O}$ ,  $^{88}\text{Sr}^{16}\text{O}$ ,  $^{94}\text{Zr}^{16}\text{O}$  and  $^{140}\text{Ce}^{16}\text{O}$  normalized by  $^{16}\text{O}$  for PLD-5 (PLD-YSZ layer).

### Screen-printed YSZ, as-prepared



### Screen-printed YSZ, tested



**Figure S3.** SIMS elemental mapping of  $^{58}\text{Ni}$ ,  $^{59}\text{Co}^{16}\text{O}$ ,  $^{88}\text{Sr}^{16}\text{O}$ ,  $^{94}\text{Zr}^{16}\text{O}$  and  $^{140}\text{Ce}^{16}\text{O}$  normalized by  $^{16}\text{O}$  for SP-2 (screen-printed YSZ layer).