Supporting information

Enhanced Performance of Gadolinia-doped Ceria Diffusion Barrier Layers Fabricated by Pulsed Laser Deposition for Large-Area Solid Oxide Fuel Cells

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1. Experimental XRD diffractograms in an extended range for samples after different annealing temperatures

**Figure S1.** Top-surface XRD spectra in the range of 28-62° of PLD CGO barrier layers annealed at several temperatures.
2. Experimental SEM-EDX line scans of the relative amount of Gd and Zr into barrier for different annealing temperatures

Figure S2. Relative percent of: (a) Gd, and (b) Zr, determined by SEM-EDX, in the barrier layer-electrolyte region for samples annealed at different temperatures.
3. Experimental SEM microstructures of button cells with as-deposited PLD, annealed PLD, and screen-printed barrier layers

![Cross-section SEM of the cells with: (a) as-deposited PLD, (b) annealed PLD, and (c) screen-printed CGO barrier layers, after sintering of LSCF.](image)

**Figure S3.** Cross-section SEM of the cells with: (a) as-deposited PLD, (b) annealed PLD, and (c) screen-printed CGO barrier layers, after sintering of LSCF.
4. Experimental degradation tests at long-term of button cells with as-deposited and annealed barrier layers

![Graphs showing experimental results](image)

**Figure S4.** (a) Chronopotentiometry at 0.5 A.cm\(^{-2}\), and (b) ohmic resistance with the time for different cells with as-deposited and annealed CGO barrier layers.