Electronic Supplementary Information

Texturing of pure and doped CeO\textsubscript{2} thin films by EBPVD through target engineering
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Atomic Force Microscope (AFM) analysis was carried out to know the surface morphology of deposited thin film. Figure 5 shows the representative AFM images of CeO\textsubscript{2} and SDC film deposited from the target material annealed at 500 °C. Difference in surface morphology were observed between CeO\textsubscript{2} and SDC film. The average roughness ($R_a$) calculated from the AFM image shows that the CeO\textsubscript{2} film ($R_a = 9.754$ nm) have higher roughness compared to SDC film ($R_a = 4.871$ nm). The crystallite size calculated from Scherer’s formula shows that the SDC film have lower crystallite compared to CeO\textsubscript{2} film. Thus the lower crystallite size for SDC film leads to the lower $R_a$ compared to that of CeO\textsubscript{2} film under similar deposition condition. Both CeO\textsubscript{2} and SDC film have $R_a$ value lower than 10 nm indicates the lower aggregation of grain with minimum pore formation during the growth of the thin film.

Supplementary Figure 1. AFM image of (a) CeO\textsubscript{2} and (b) SDC film deposited from the target material annealed at 500 °C were taken in non-contact mode using a Solver Pro from NTMDT, Russia.