Supplementary Information

Photonic sintering of oxide ceramic films: effect of colored Fe_xO_y nanoparticle pigments

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Keywords: ceramic coating; flash lamp annealing; photonic sintering; iron oxide nanoparticle pigments

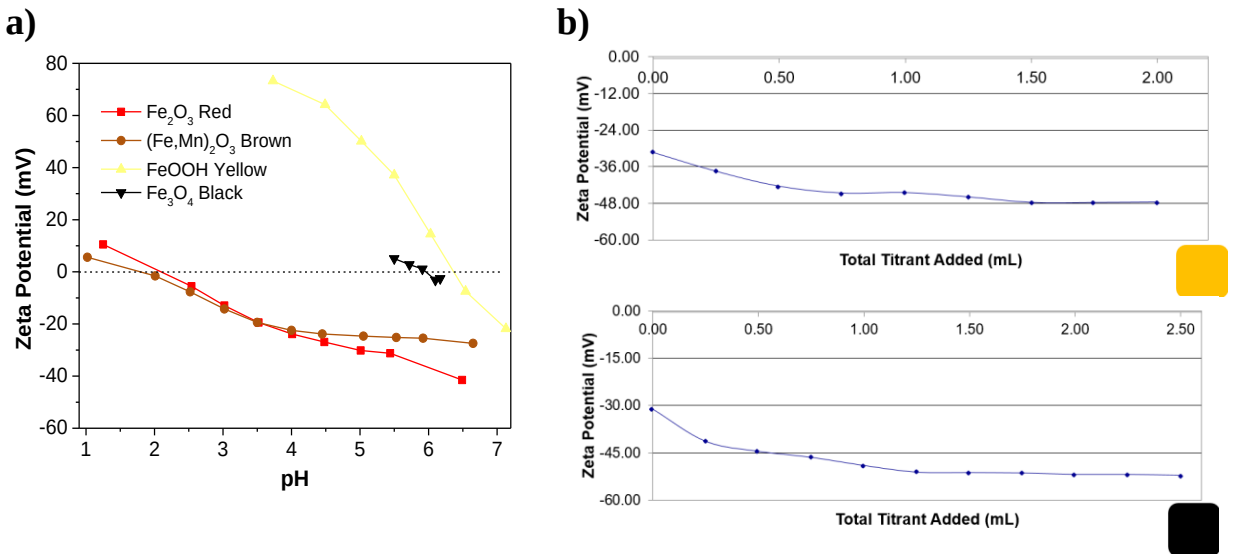

Figure S1. Zeta potential a) of all colored Fe_xO_y nanoparticle pigments in water, b) dependence on the amount of added titrant (ammonium citrate).

Table S1. Absolute density and specific surface area (SSA) of raw powders measured by helium pycnomerty and BET measurements, respectively, and calculated BET average particle sizes for all powders.

	absolute density [g/cm^3]	SSA [m^2/g]	BET average particle size [nm]
μm-Al_2O_3 (AA3)	4.0	0.4	3756
nm-Al_2O_3 (TM-DAR)	3.9	11.8	129
α-Fe_2O_3 (Bayferrox Red 110)	5.0	15.2	104

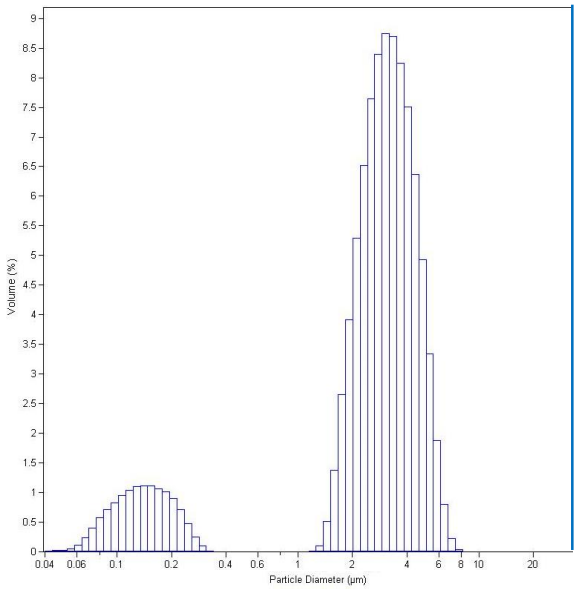

Figure S2. Volume-based LD particle size distribution of Red Al_2O_3:Fe_2O_3 ceramic slurry in water dispersed by means of ammonium citrate. The first broad peak corresponds to the mixture of nm-Al_2O_3 and nm-Fe_2O_3, while the second peak – to the μm-Al_2O_3.

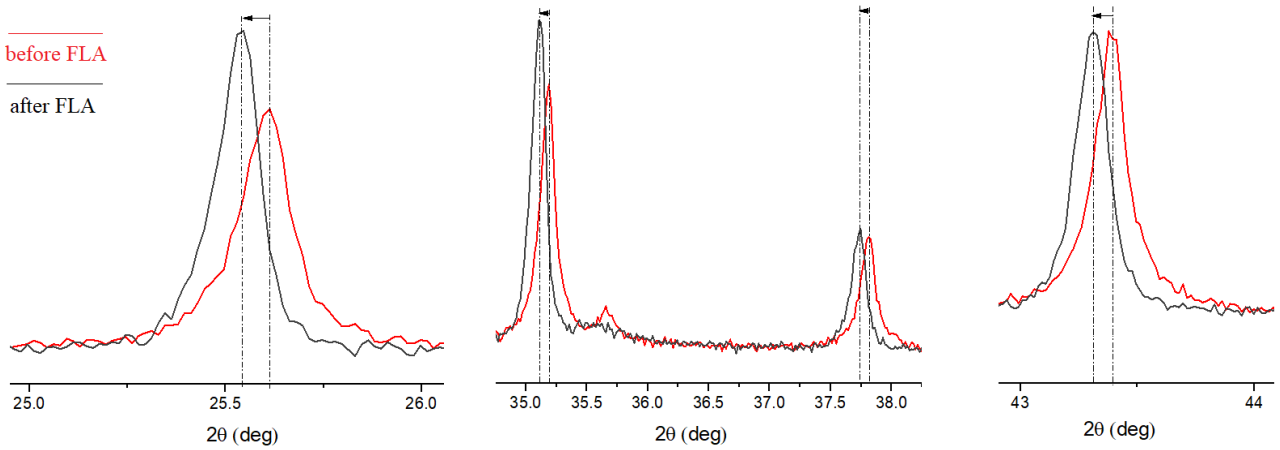

Figure S3. Enlarged XRD pattern peaks (from Fig. 4a) – (1 0 -2), (0 1 -4), (1 -2 0), and (2 -1 -3) - indicating the small shift of the corundum peaks by 1° 2θ.

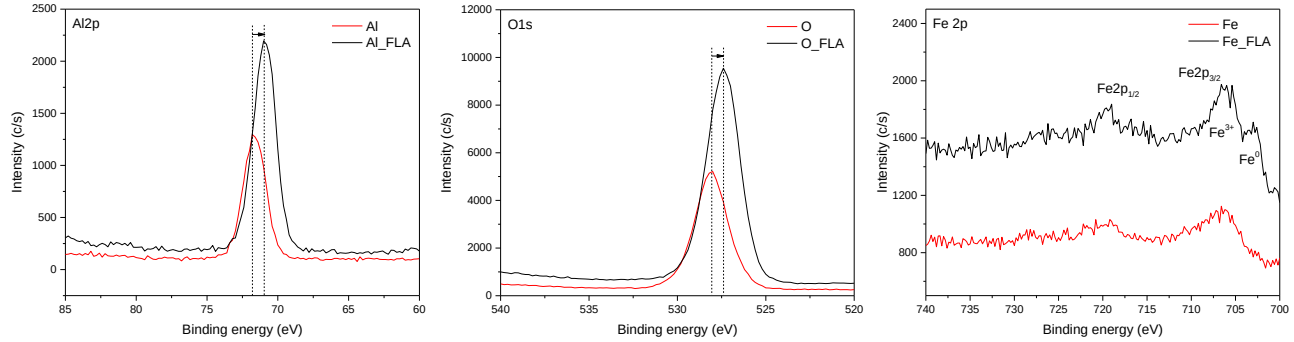

Figure S4. Al 2p, Fe 2p, and O 1s XPS peaks of the Red Al_2O_3:Fe_2O_3 layers samples before and after FLA. Al and O peaks indicate a shift towards lower binding energies for the samples after FLA.

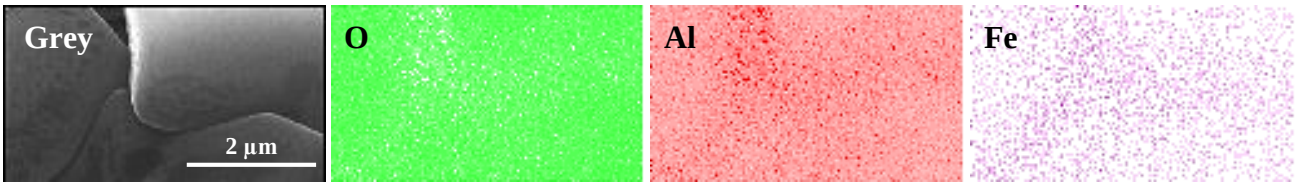

Figure S5. EDX maps of the grains interconnection for the FLA-sintered Red Al_2O_3:Fe_2O_3 layer.

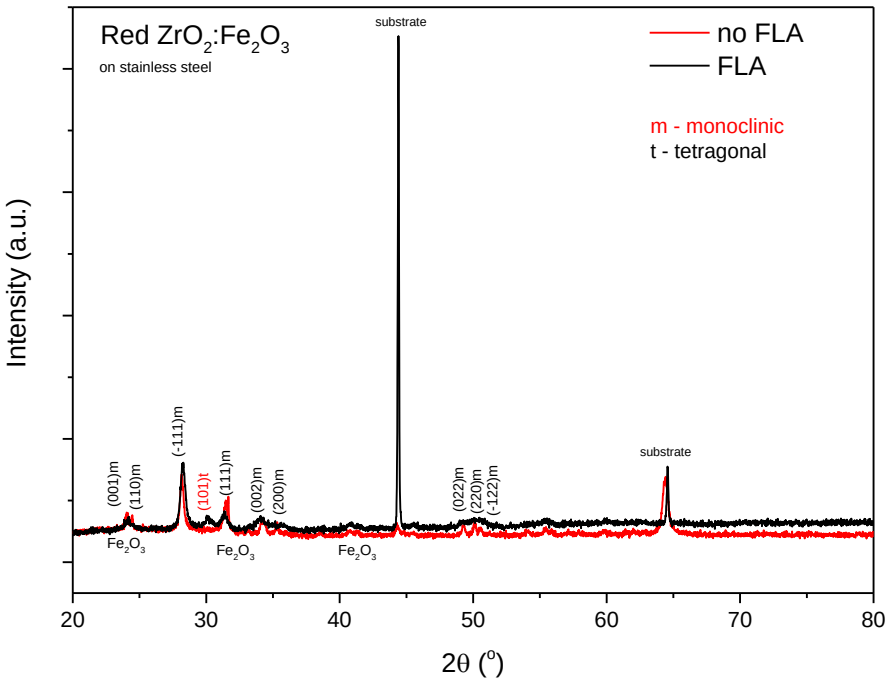

Figure S6. Indexed XRD patterns of the ceramic Red ZrO_2:Fe_2O_3 ceramic film before and after FLA.

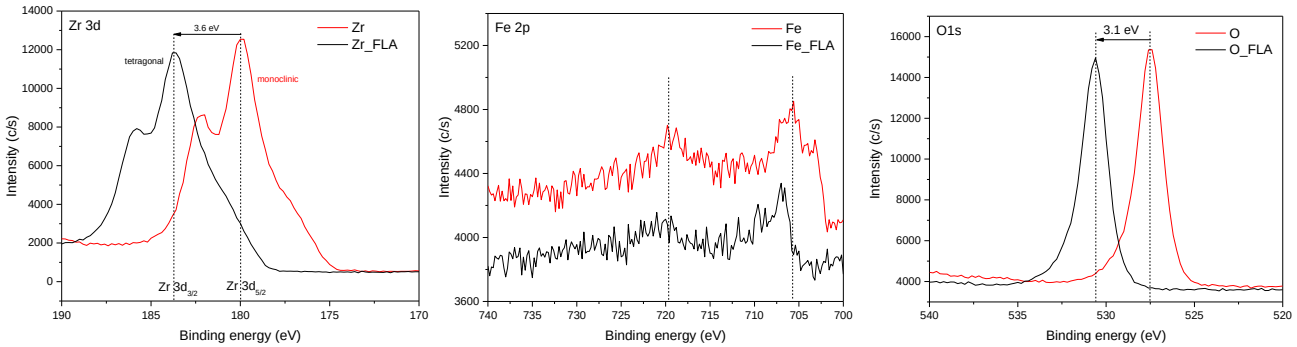

Figure S7. Zr 3d, Fe 2p, and O 1s XPS peaks of the Red ZrO_2:Fe_2O_3 layers samples before and after FLA. Zr and O peaks indicate a shift towards higher binding energies for the samples after FLA.