materials

Comparative study of electrophoretic deposition of doped $BaCeO_3$-based films on $La_2NiO_{4+\delta}$ and $La_{1.7}Ba_{0.3}NiO_{4+\delta}$ cathode substrates

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Supplementary Materials

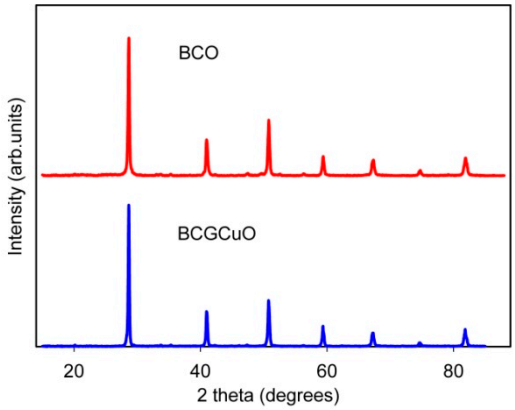


Figure S1. X-ray diffraction (XRD) patterns of the micro-sized $BaCeO_3$ (BCO) and $BaCe_{0.89}Gd_{0.1}Cu_{0.01}O_{3-\delta}$ (BCGCuO) powders.

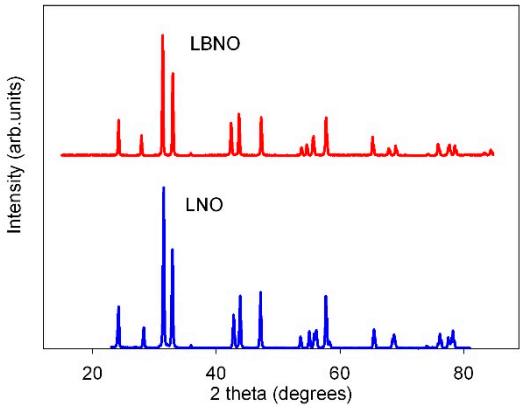


Figure S2. XRD patterns of the micro-sized $La_2NiO_{4+\delta}$-based (LNO) and $La_{1.7}Ba_{0.3}NiO_{4+\delta}$ (LBNO) powders.

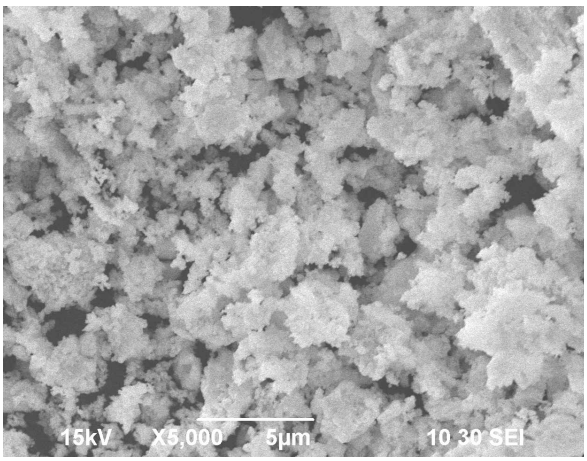


Figure S3. Morphology of the micro-sized BCGCuO powder after final milling.

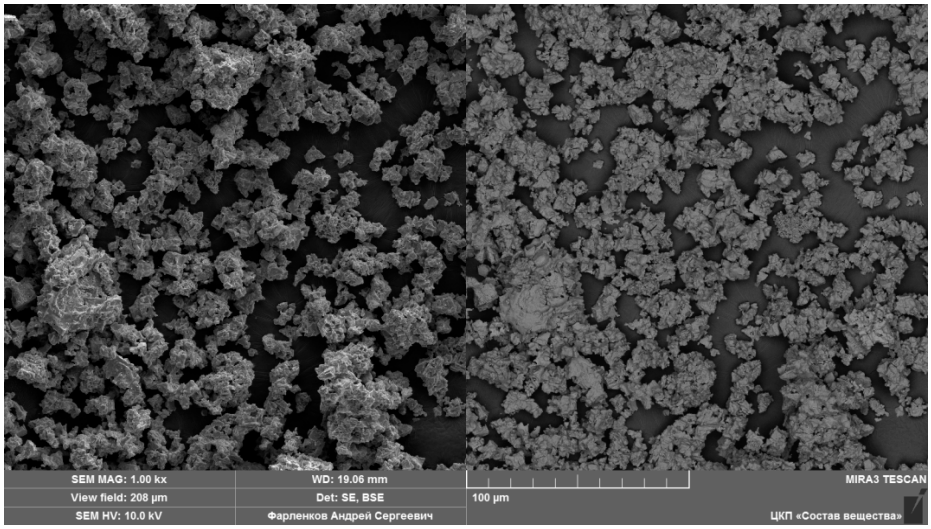


Figure S4. Morphology of the micro-sized BCO powder after final milling.

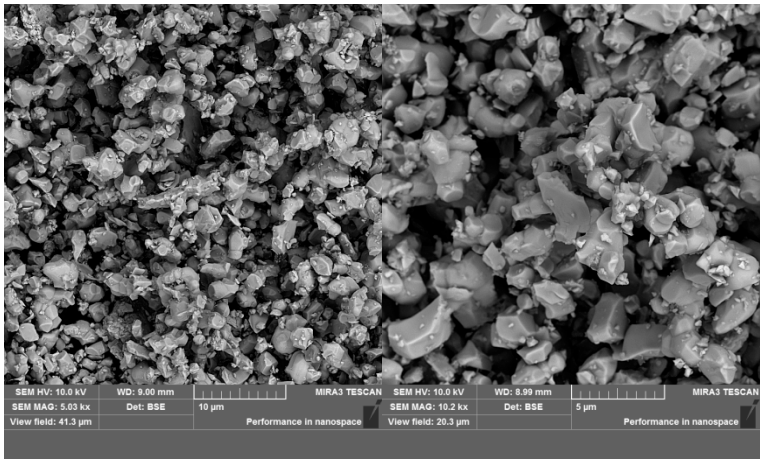


Figure S5. Morphology of the micro-sized LNO powder, obtained by the solid state reaction method after final milling.

Table S1. Chemical analysis of the BCGCuO powder after the synthesis, in at. %.

Ba	**20.51**
Ce	18.32
Gd	1.80
Cu	0.15

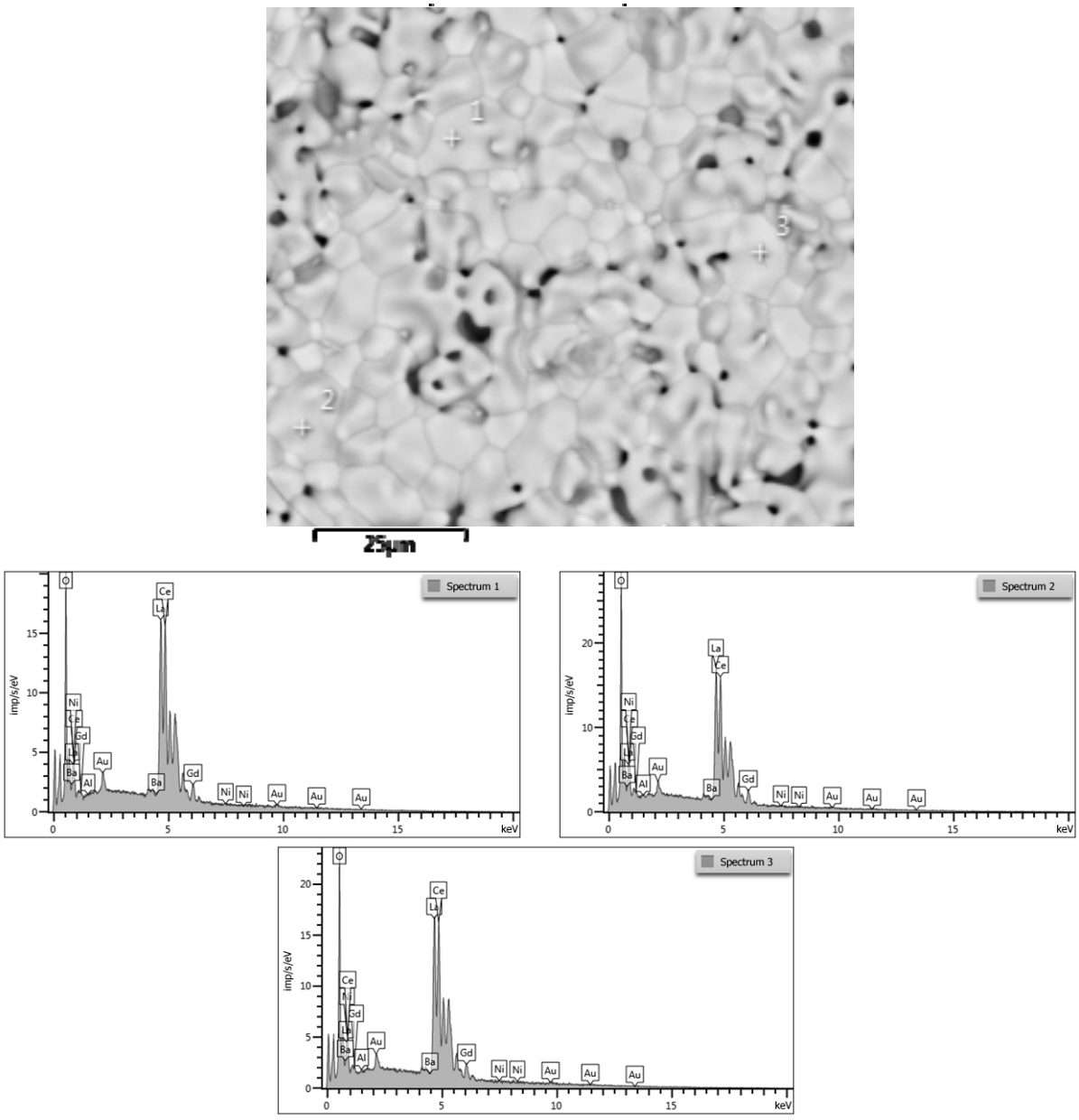


Figure S6. X-Ray energy-dispersive (EDX) spectra for the BCGCuO film, deposited on the LNO substrate and sintered at 1450°C (surface).

Table S2. Averaged chemical composition the BCGCuO film, deposited on the LNO substrate and sintered at 1450°C in at. % (surface):

Elements	**1 spectrum**	**2 spectrum**	**3 spectrum**
O	61.24	66.76	63.76
Al	0.00	0.57	0.00
Ni	0.00	0.00	0.00
Ba	0.00	0.00	0.00
La	18.91	16.10	17.73
Ce	18.32	15.33	17.20

Gd	0.54	0.59	0.52
Au	0.99	0.66	0.79
Sum	100.00	100.00	100.00

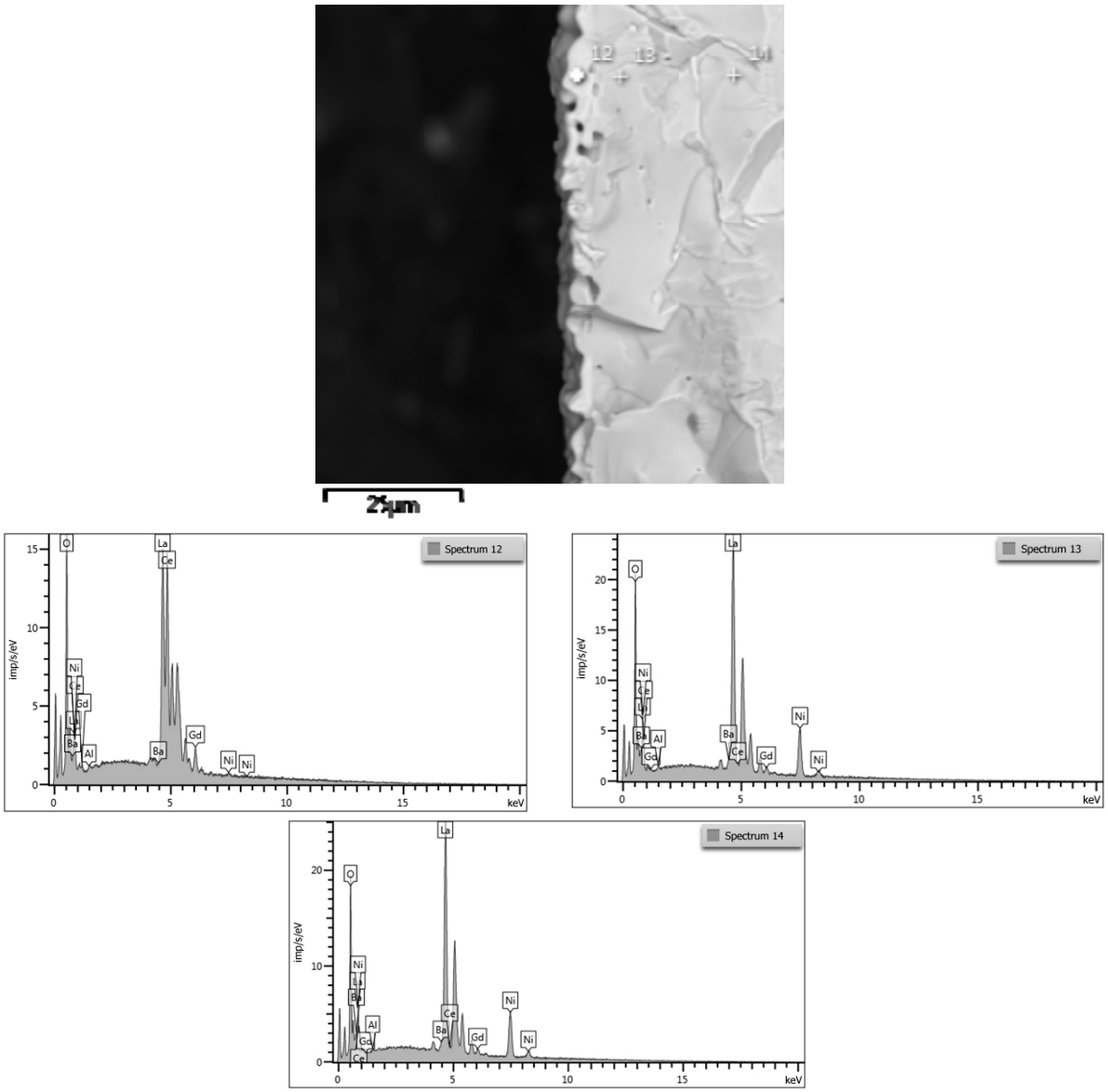


Figure S7. EDX spectra for the BCGCuO film, deposited on the LNO substrate and sintered at 1450°C (cross section).

Table S3. Averaged chemical composition the BCGCuO film, deposited on the LNO substrate and sintered at 1450°C in at. % (cross section):

Elements	1 spectrum	2 spectrum	3 spectrum
O	57.14	56.60	54.98
Al	0.70	0.85	0.00
Ni	0.56	13.66	14.39
Ba	0.00	0.71	0.77
La	20.78	28.18	29.86
Ce	19.97	0.00	0.00
Gd	0.85	0.00	0.00
Sum	100.00	100.00	100.00

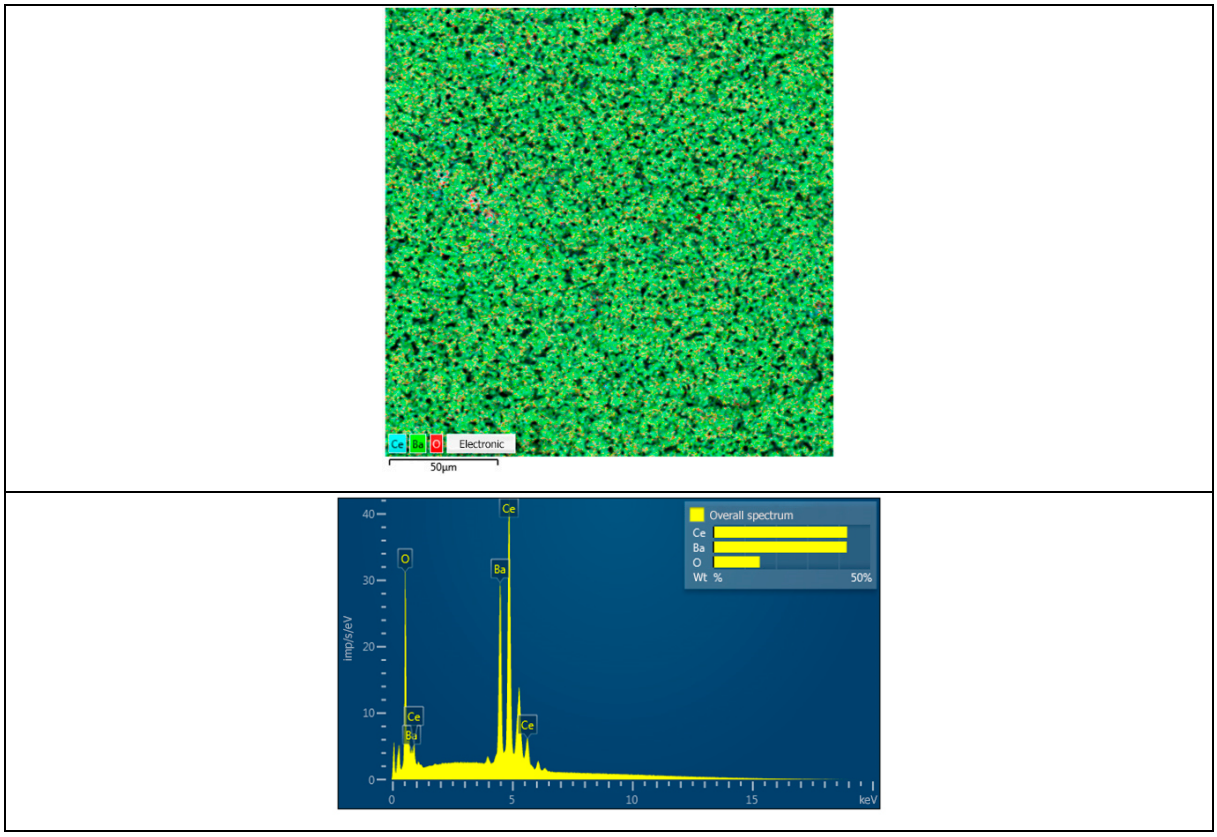
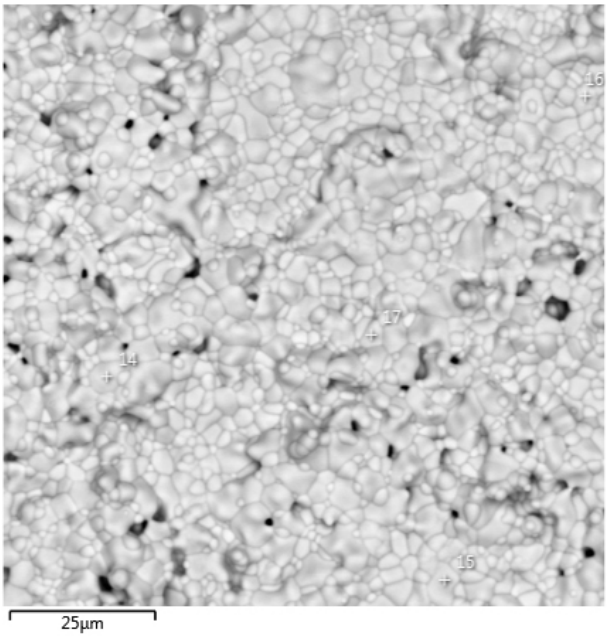


Figure S8. The overall EDX spectrum for the BCGCuO/BCO film, deposited on the LNO substrate (surface).

Table S4. Averaged chemical composition of the the BCGCuO/BCO film, deposited on the LNO substrate (surface) (at. %):

Elements	Overall spectrum
O	60.19
Ba	20.07
Ce	19.74
Sum	100.00



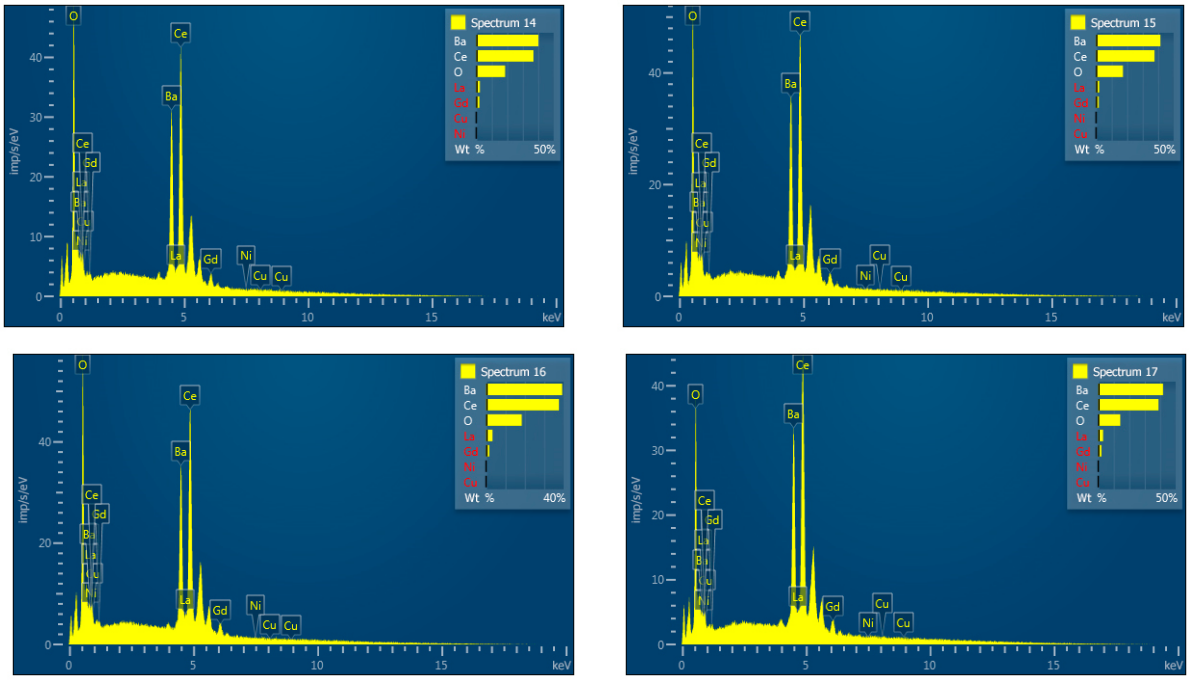


Figure S9. EDX spectra for the BCGCuO film, deposited on the LBNO substrate and sintered at 1450°C (surface).