Ultrasonic decoating as a new recycling path to separate oxygen side layers of solid oxide cells

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Supplementary Information

Additional material information

XRD pattern of comparable LSCF see: http://hdl.handle.net/2128/31605

XRD pattern of comparable LSM see: https://fuelcellmaterials.com/products/powders/cathode-powders/cathode-lanthanum-based/lanthanum-strontium-manganite-20-cathode-powder/#x-ray-diffraction
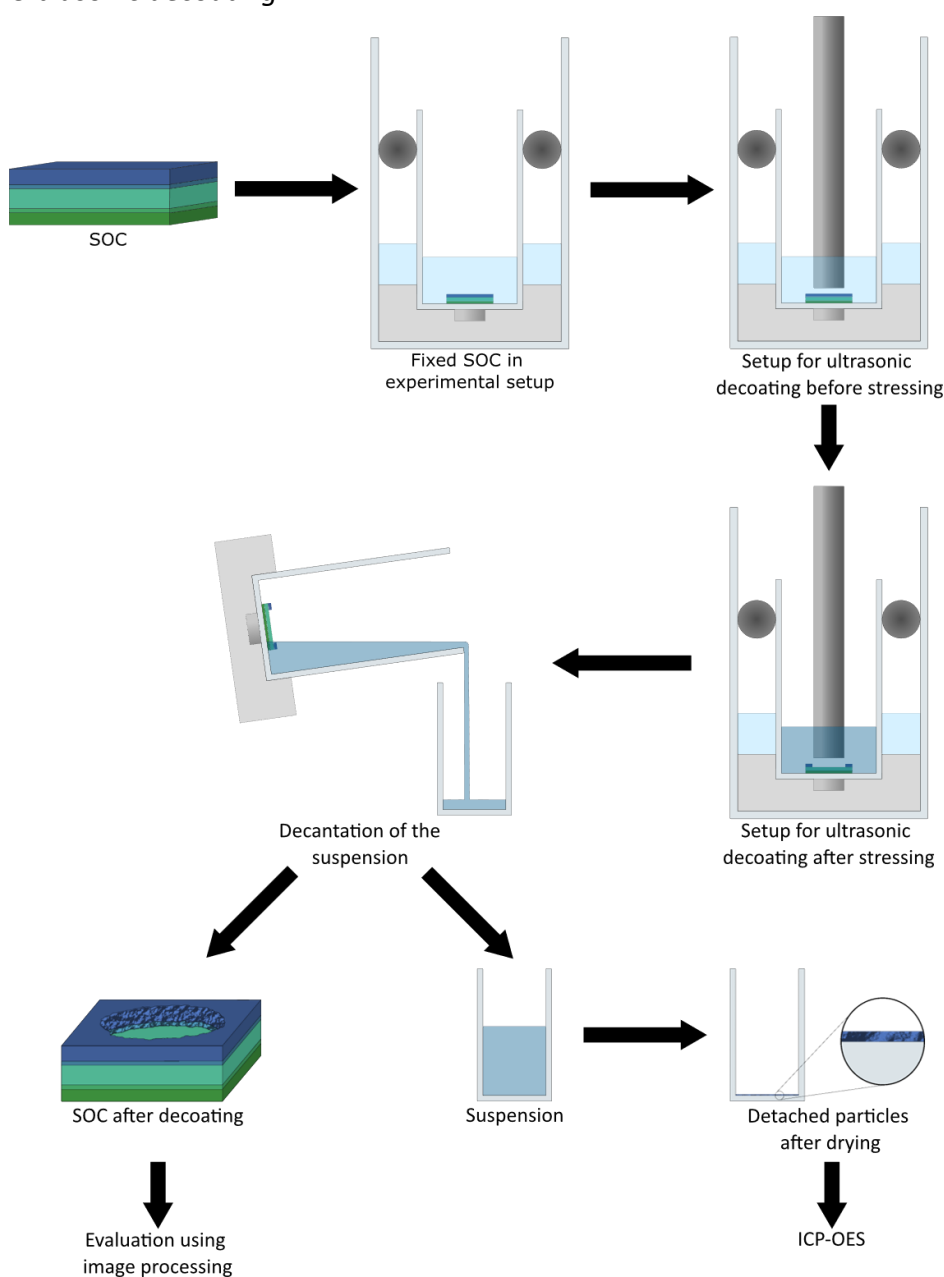
Ultrasonic decoating
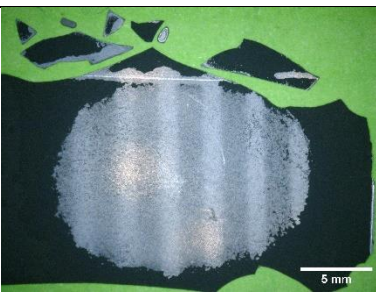
Figure S1: Workflow for ultrasonic decoating

Raw image data

Table S1: Raw images data of cell type 1a

Sample	Spacing in mm	Time in s	Image after stressing
1a-1	2	5	
1a-2	2	5	
1a-3	2	5	
1a-4	2	10	
1a-5	2	10	

Sample	Spacing in mm	Time in s	Image after stressing
1a-6	2	10	
1a-7	2	15	
1a-8	2	15	
1a-9	2	15	
1a-10	2	30	
1a-11	2	30	
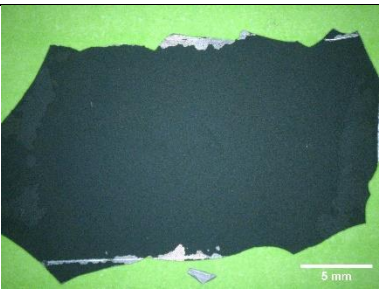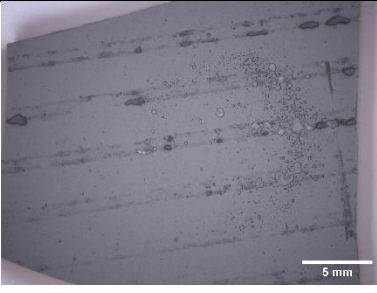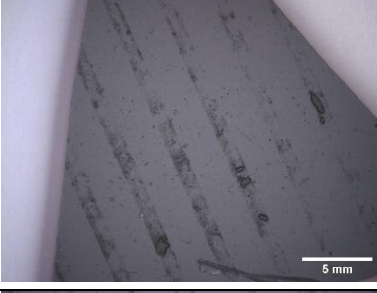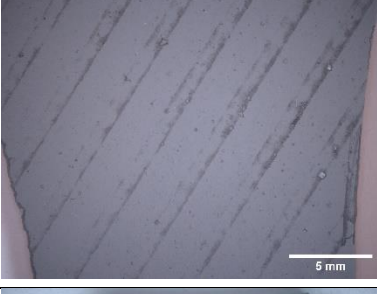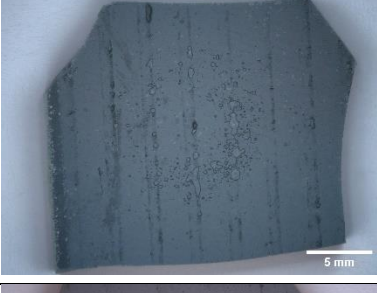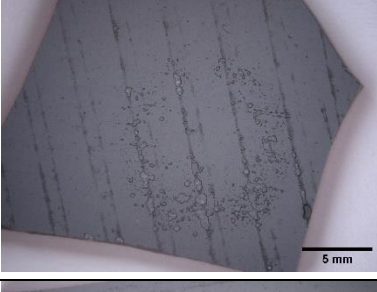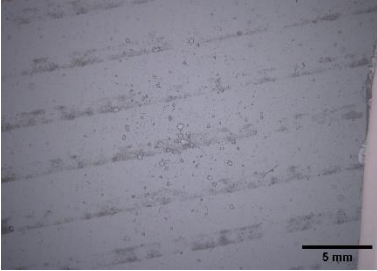
Sample	Spacing in mm	Time in s	Image after stressing
1a-12	2	30	
1a-13	3	30	
1a-14	3	30	
1a-15	4	30	
1a-16	4	30	

Table S2: Raw images data of cell type 1b

Sample	Spacing in mm	Time in s	Image after stressing
1b-1	2	5	
1b-2	2	5	
1b-3	2	5	
1b-4	2	10	
1b-5	2	10	
1b-6	2	10	
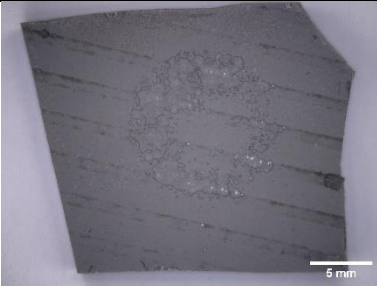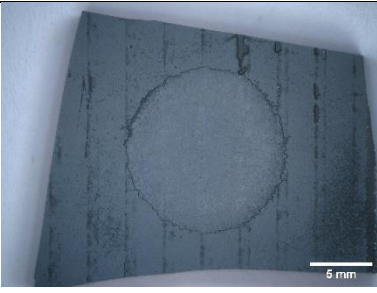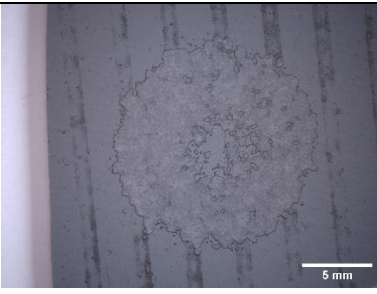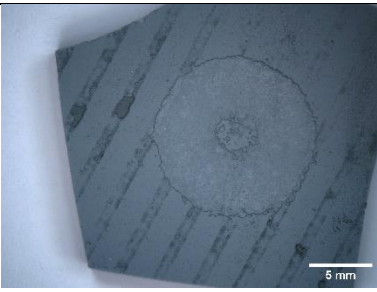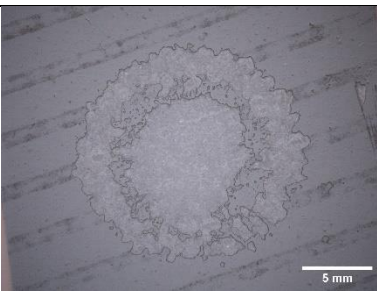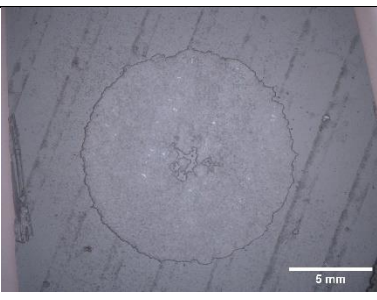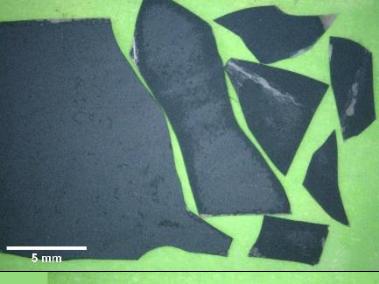
Sample	Spacing in mm	Time in s	Image after stressing
1b-7	2	30	
1b-8	2	30	
1b-9	2	30	
1b-10	2	60	
1b-11	2	60	
1b-12	2	60	

Table S3: Raw images data of cell type 2

Sample	Spacing in mm	Time in s	Image after stressing
2-1	4	120	
2-2	4	120	
2-3	3	120	
2-4	3	120	
2-5	2	120	
2-6	2	120	

Detailed image processing steps

SOC after ultrasonic decoating

Color threshold segmentation in Lab color space using 'Minimum thresholding method' for L* and a* histogram

Threshold segmentation for 8-bit converted image using a manual threshold of 254

Image after threshold segmentation

Post-processed image after removal of segmented noise of the green background

Measuring the count of the white pixels and converting the value to an area using the known px/unit ratio

Figure S2: Image processing for images with a good contrast between decoated area and coated area

SOC after ultrasonic decoating

Gaussian blurred image with σ=50

Calculated image substracting
the original image from the
blurred image using "Image calculator"

Threshold segmentation with
a manual threshold

Area filled image

Manually post-processed
image

Measuring the count of the white pixels and
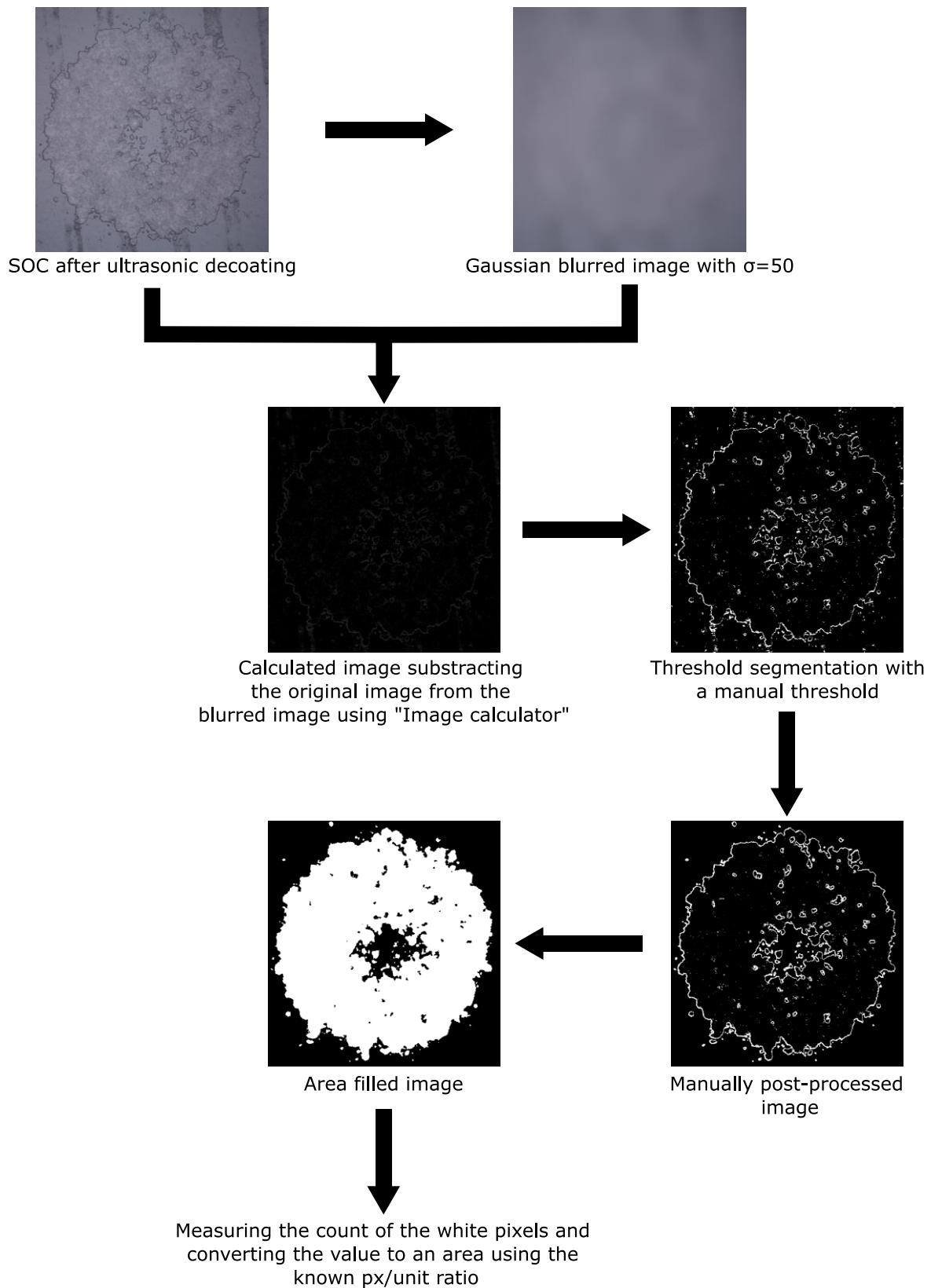converting the value to an area using the
known px/unit ratio

Figure S3: Image processing for images with a poor contrast between decoated area and coated area but a sharp contour line