

## Article

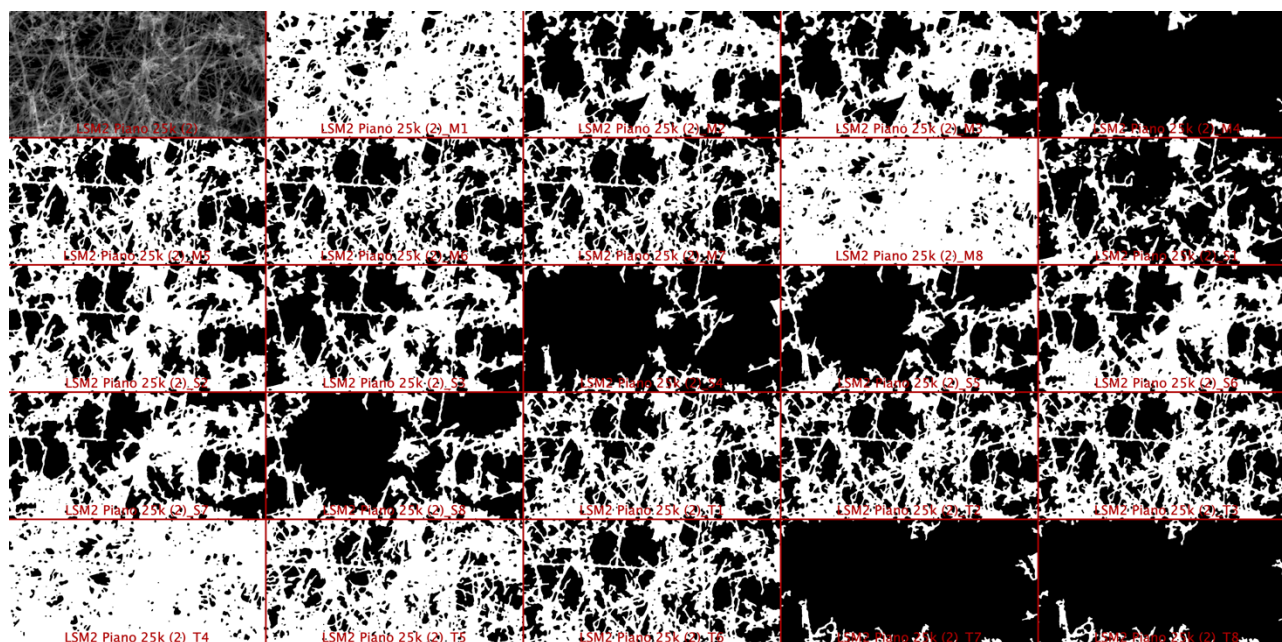
# Structural and Catalytic Characterization of $\text{La}_{0.6}\text{Sr}_{0.4}\text{MnO}_3$ Nanofibers for Application in Direct Methane Intermediate Temperature Solid Oxide Fuel Cell Anodes

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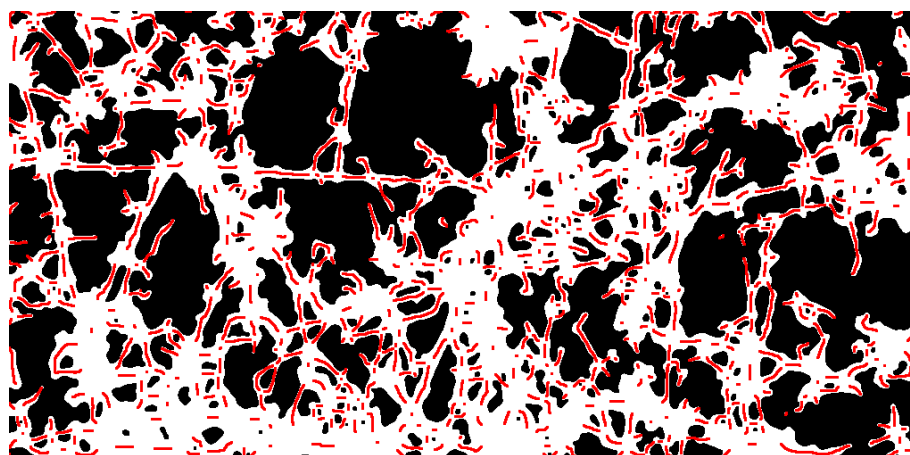
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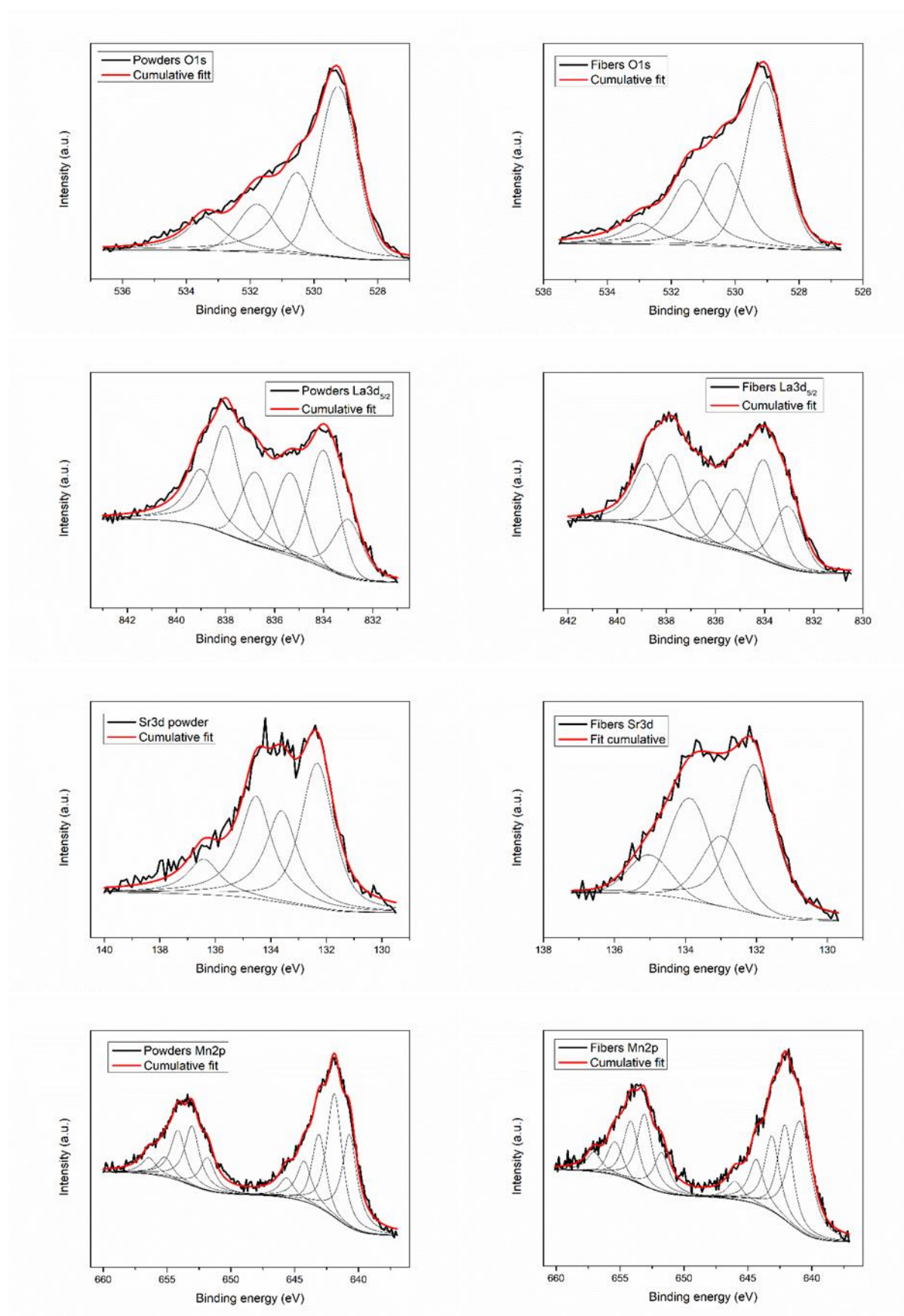
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**Figure S1.** Example of ImageJ segmentation process. In the left top corner, the original SEM picture is reported. The other images are the black/white segmented images.



**Figure S2.** Example of ImageJ diameter location process. The red lines represent the central axes of the nanofibers in one of the segmented images.



**Figure S3.** Fitting curves for the different element lines studied in this work. From top to bottom: O1s, La3d, Sr3d, Mn2p. On the left there are the powders spectra, while on the right those for fibers.

**Table S1.** Fitting parameters of the different studied orbitals.

<b>La 3d</b>			<b>Powders</b>		<b>Fibers</b>	
Peak	Position	%	Position	%	Position	%
1	833.1	12.3	833.0	12.6		
2	833.9	20.6	834.0	21.2		
3	835.4	14.2	835.2	12.6		
4	836.8	12.5	836.5	14.2		
5	838.0	26.1	837.8	22.7		
6	839.1	14.2	838.9	16.7		
<b>Sr 3d</b>			<b>Powders</b>		<b>Fibers</b>	
Peak	Position	%	Position	%	Position	%
1	132.3	39.7	132.1	46.3		
2	133.6	28.5	133.5	19.3		
3	134.5	31.8	134.2	24.8		
4	136.4	11.0	135.0	9.6		
<b>Mn 2p</b>			<b>Powders</b>		<b>Fibers</b>	
Peak	Position	%	Position	%	Position	%
1	640.7	18.5	641.1	15.3		
2	641.9	22.3	642.3	24.8		
3	643.1	11.5	643.5	12.6		
4	651.8	6.6	652.2	7.0		
5	653.1	11.9	653.3	12.0		
6	654.1	10.0	654.5	9.2		
7	644.3	8.0	644.7	7.9		
8	655.2	3.9	655.6	4.5		
9	645.6	4.0	646.0	3.2		
10	656.4	3.3	657.0	3.4		
<b>O1s</b>			<b>Powders</b>		<b>Fibers</b>	
Peak	Position	%	Position	%	Position	%
1	529.2	44.8	529.1	43.9		
2	530.5	30.0	530.4	26.1		
3	531.8	12.8	531.5	22.4		
4	533.4	12.5	533.3	7.6		

The fittings results confirm what was previously discussed on the XPS spectra interpretation. No substantial differences between the XPS spectra fitting parameters for La3d are detected. The Mn2p spectrum for fibers shows a systematic shift to higher binding energies of the peaks, which is not observed for the other elements. The main difference between the Sr3d spectra for fibers and powders is given by the percentual intensities of the peaks 1 (~132 eV) and 3 (~134 eV). The first one is referred to the perovskite structure and the intensity percent value is higher for fibers, while the second one, given by the SrO present in the surface, is higher for powders. In the O1s spectra a substantial different intensity is present for the peak 3 (~531.5). This peak was attributed to the presence of hydroxyls species formed on the surface due to the air exposition of the samples.