

## Electronic Supplementary Information

### A preliminary study of the pseudo-capacitance feature of strontium doped lanthanum manganite

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#### Experimental

In order to clarify the contribution from the carbon paper to the capacitance, four type of electrodes, i.e. pure carbon paper, carbon paper with binder, carbon paper with LSM and carbon paper with yttria-stabilized zirconia (YSZ) were tested as electrode, respectively. Here, YSZ particles without pseudo-capacitance feature were applied onto the carbon paper to simulate the carbon paper-LSM electrode, thus the contribution of carbon paper to the capacitance can be evaluated accurately. All the electrodes (1 cm × 2 cm) were prepared by a cost-effective and simple dipping process. The appropriate amount of binder was dissolved in absolute ethyl alcohol (20 mL), then the carbon paper were immersed into the solution and held certain time, finally the carbon paper with binder was dried with hair dryer. For the preparation of carbon paper-LSM and carbon paper-YSZ electrodes, the solution was changed to appropriate amount of binder and LSM or YSZ powders dispersed in absolute ethyl alcohol (20 mL). The dipping-drying cycle was repeated three times to increase the binder and LSM or YSZ loading. In this paper, the LSM or YSZ loading in the carbon paper is 0.303 mg cm<sup>-2</sup>.

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The cyclic voltammetry (CV) for series of carbon paper electrodes were characterized by a standard three-electrode configuration in 1.0 M Na<sub>2</sub>SO<sub>4</sub> aqueous solution, where Ag/AgCl and a piece of platinum foil were used as reference electrode and counter electrode, respectively.

The solubility of LSM in the neutral Na<sub>2</sub>SO<sub>4</sub> electrolyte solution over extended period of time were tested. Three carbon paper-LSM electrodes were immersed into 1.0 M Na<sub>2</sub>SO<sub>4</sub> solution of 40 mL for 12 h, 24 h and 48 h, respectively. The loading mass of each electrode is 2 mg. The concentration of La-, Sr- and Mn-ion in the resulted solution was detected by inductive coupled high frequency plasma (ICP-OES, Perkin-Elmer Optima 5300DV, U. S.).

## Results

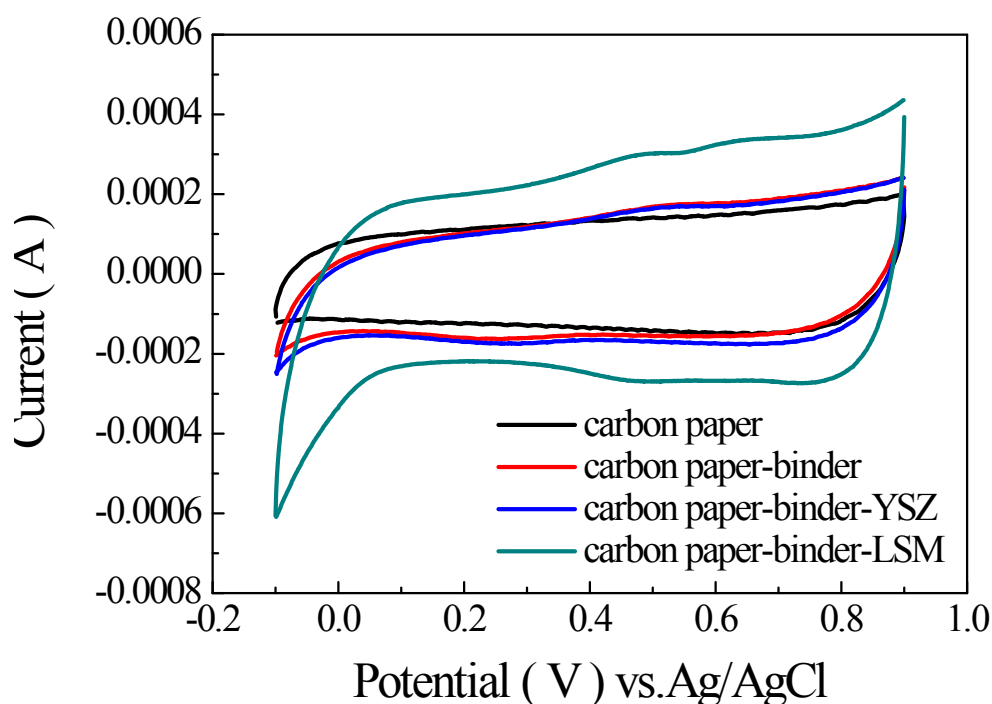


Fig. S1 The cyclic voltammetry (CV) curves of carbon paper, carbon paper-binder, carbon paper-YSZ and carbon paper-LSM electrodes measured at a scan rate of 2 mV/s in 1.0 M Na<sub>2</sub>SO<sub>4</sub> solution

Table S1 The solubility of LSM in 1.0 M sodium sulfate solution

Immersion time ( h )	La (mg L <sup>-1</sup> )	Mn (mg L <sup>-1</sup> )	Sr (mg L <sup>-1</sup> )
12	0.005	0.051	0.035
24	0.025	0.068	0.088
48	0.022	0.037	0.063