DEVELOPMENT OF CATHODE MATERIALS BY PLASMA PROCESS AT ROOM TEMPERATURE

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The Radio-Frequency cold plasma leads to produce high concentration of reactive species due to the collisions of energetic electrons with molecules. In this process fine droplets of the aqueous precursors (nitrates) are sprayed through an Ar-H_2 plasma reactor equipped with a nozzle. Under the phenomena due to the wave shocks produced by the nozzle and the oxidant properties of plasmas containing H_2O and O_2 , the decomposition of nitrate precursors leads to the formation of thin layers of $La_{1-x}Sr_xMnO_{3\pm\delta}$. The plasma parameters permit to control the purity and stoichiometry of the deposits.

The properties of the deposits are controlled by XRD, SEM, TEM and impedance measurements. The infrared analysis of the deposits permits to determine the effect of the plasma power and the oxygen flow on the conversion rate of the precursors.

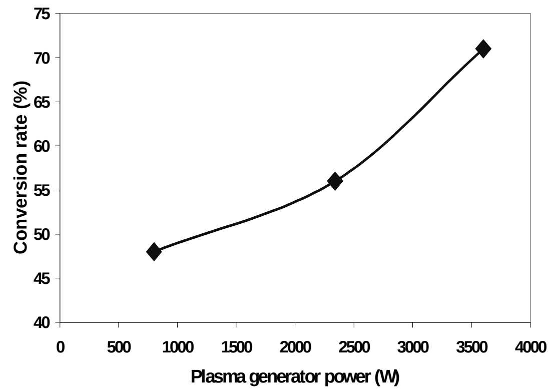

Figure 1 : Decomposition of nitrate precursors depending on the applied plasma power for deposits of $La_{0.7}Sr_{0.3}MnO_3$.

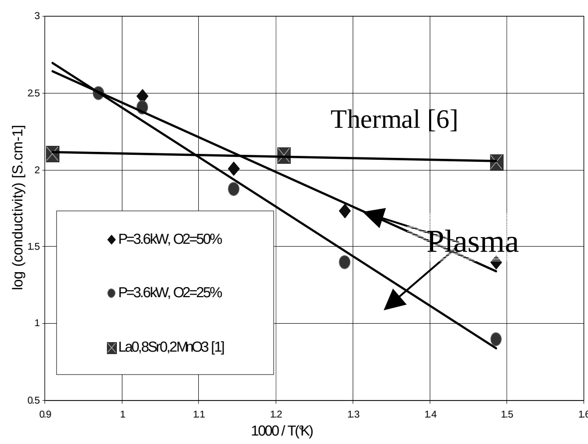

Figure 2 Arrehnius plots of conductivity for $La_{0.7}Sr_{0.3}MnO_3$ deposited at oxygen rate 25% and 50% in plasma gas, plasma power = 3.6 kW. Comparison with the conductivity of $La_{0.8}Sr_{0.2}MnO_3$ achieved by liquid mixture method [6].

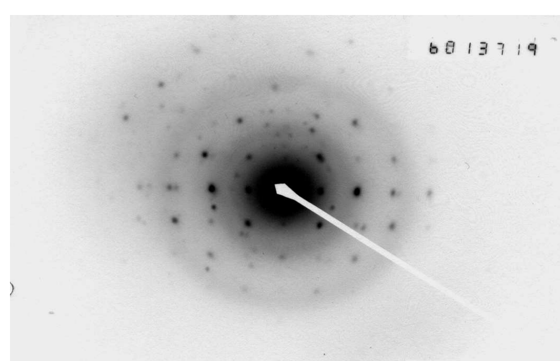

Figure 3. Electron diffraction achieved by Transmission Electron Microscope shows a monoclinic crystallographic system.