

**Experiment title:**Study of the oxidation state in LaMnO₃ related perovskites.**Experiment****number:**

CH154

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6

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Report:

Samples of LaMnO₃ perovskite prepared under different conditions and with several temperature treatments presents different stoichiometries. Depending on these preparation some samples shows magnetoresistance effect (known as the colossal one). We have measured the EXAFS and XANES spectra at the La L₃- and at the Mn K-edge in order to determine the relative quantity of Mn⁴⁺ and Mn³⁺ cations.

Experiments have been performed in transmission detection mode with the Si(111) as the monochromator crystals. It is possible to observe some differences at the spectra but the fit for the concentration of Mn⁴⁺ and Mn³⁺ species is very difficult due to the resolution of these monochromator crystals. Perhaps the use of Si(311) crystals will allow

some much more better spectra in order to have a good fit of the concentration of cations.

By comparison with calcium doped samples ($\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$), it has been possible to determine that the quantity of Mn^{4+} is similar in both types of samples which explain why the magnetic and magnetotransport properties are similar in both systems: the Ca substituted and the obtained by different treatments which makes the samples to have a high concentration of Mn^{4+} cations.

EXAFS data are being analyzing together with neutron scattering diffraction data in order to determine the crystallographic phases. After a first look of the data, it seems that at least, two different short order arrangements coexist and that they could be related with the both Mn^{3+} and Mn^{4+} species.