



	<b>Experiment title:</b> "Structure and oxidation state characterization of the Co(I) oxide LaSrCoCo <sub>3</sub> ."	<b>Experiment number:</b> CH-942
<b>Beamline:</b>	<b>Date of experiment:</b> from: 13/11/00 to: 14/11/00	<b>Date of report:</b> 15/3/02
<b>Shifts:</b> 3	<b>Local contact(s):</b> Fitch	<i>Received at ESRF:</i>
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## Report:

Data were collected on BM16 at 290K and 10K at  $\lambda = 0.40576(1)\text{\AA}$  on a sample of what was at the time of the experiment thought to be LaSrCoO<sub>3</sub>. The subsequent analysis of these data, together with neutron powder diffraction and  $\mu$ SR, demonstrated that the phase studied was in fact the first extended transition metal oxide hydride, LaSrCoO<sub>3</sub>H<sub>0.7</sub>, resulting in a publication in Science whose details are given below:

**Science, 295, 1882, 2002**

### **The Hydride Anion in an Extended Transition Metal Oxide Array – LaSrCoO<sub>3</sub>H<sub>0.7</sub>**

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**Abstract**

We present the synthesis and structural characterisation of a transition metal oxide hydride,  $\text{LaSrCoO}_3\text{H}_{0.7}$ , which adopts an unprecedented structure in which oxide chains are bridged by hydride anions to form a two-dimensional extended network. The metal centers are strongly coupled by their bonding with both oxide and hydride ligands to produce magnetic ordering up to at least 350 K. The synthetic route is sufficiently general to allow the prediction of a new class of transition metal-containing electronic and magnetic materials.