

**Structure and Magnetism of the Rh⁴⁺-containing
perovskite oxides La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O₃ and
La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃**

HASANLI, Nijat, SCRIMSHIRE, Alex, BINGHAM, Paul <<http://orcid.org/0000-0001-6017-0798>>, PALGRAVE, Robert and HAYWARD, Michael

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Structure and Magnetism of the Rh⁴⁺-containing perovskite oxides
La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O₃ and La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃

Nijat Hasanli, Alex Scrimshire, Paul A. Bingham, Robert G. Palgrave and
Michael A. Hayward*

Supporting Information

Table of Contents

1. ⁵⁷Fe Mössbauer Spectra of La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃

Figure S1. ⁵⁷Fe Mössbauer spectrum collected from La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃ at room temperature. Fit with one doublet fixed at CS = 0 and one free to refine.

Table S1. Parameters extracted fit to ⁵⁷Fe Mössbauer spectrum collected from La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃ in which one doublet is fixed at CS = 0 and one is free to refine ($\chi^2 = 0.694$).

2. Fe 2P and Mn 2P spectra of La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃ La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O₃.

Figure S2. Fe 2P spectrum of La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O₃.

Figure S3. Mn 2P spectrum of La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O₃.

3. Magnetic behaviour of La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O₃.

Figure S3. Expanded plot of magnetisation-field isotherm collected from La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O₃ at 5 K, showing the coercive field of the material is 190 Oe.

1. ^{57}Fe Mössbauer Spectra of $\text{La}_{0.5}\text{Sr}_{0.5}\text{Fe}_{0.5}\text{Rh}_{0.5}\text{O}_3$

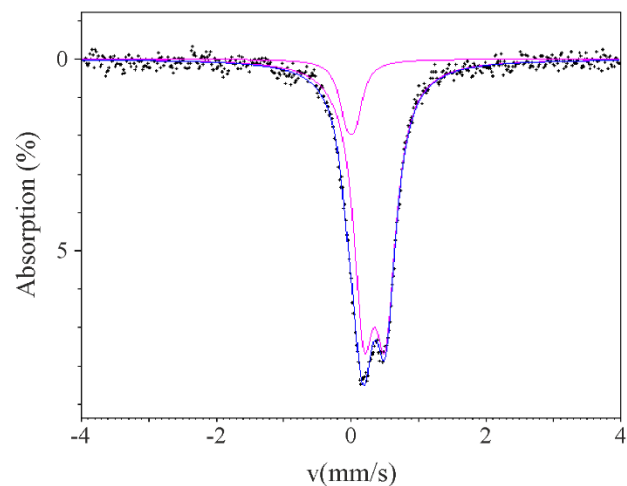


Figure S1. ^{57}Fe Mössbauer spectrum collected from $\text{La}_{0.5}\text{Sr}_{0.5}\text{Fe}_{0.5}\text{Rh}_{0.5}\text{O}_3$ at room temperature. Fit with one doublet fixed at $\text{CS} = 0$ and one free to refine.

| Doublet | CS (mm/s) | Δ (mm/s) | HWHM (mm/s) | Site population (%) |
|---------|-----------|-----------------|-------------|---------------------|
| 1 | 0.351(6) | 0.323(7) | 0.189(6) | 88(2) |
| 2 | 0 | 0.136(36) | 0.132(29) | 12(2) |

Table S1. Parameters extracted fit to ^{57}Fe Mössbauer spectrum collected from $\text{La}_{0.5}\text{Sr}_{0.5}\text{Fe}_{0.5}\text{Rh}_{0.5}\text{O}_3$ in which doublet 2 is fixed at $\text{CS} = 0$ and one is free to refine ($\chi^2 = 0.694$).

2. Fe 2P and Mn 2P spectra of $\text{La}_{0.5}\text{Sr}_{0.5}\text{Fe}_{0.5}\text{Rh}_{0.5}\text{O}_3$ $\text{La}_{0.5}\text{Sr}_{0.5}\text{Mn}_{0.5}\text{Rh}_{0.5}\text{O}_3$.

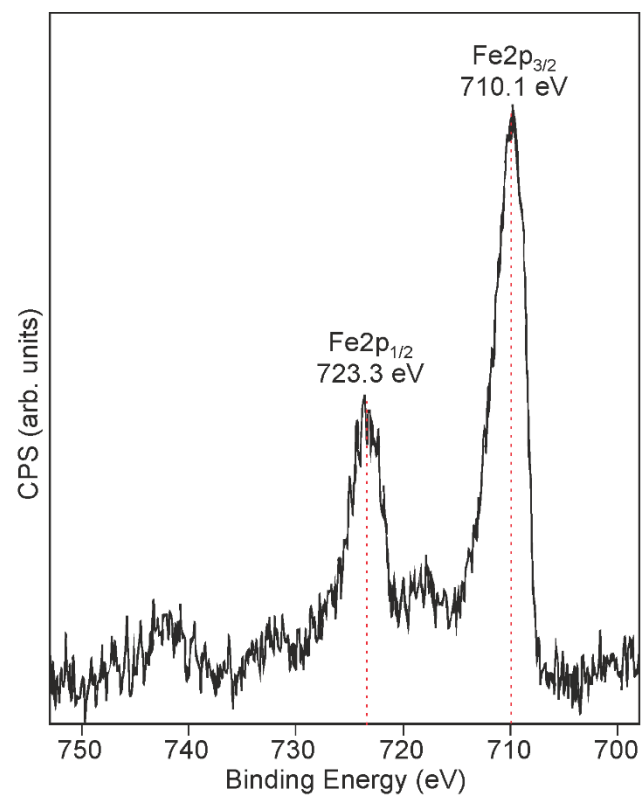


Figure S2. Fe 2P spectrum of $\text{La}_{0.5}\text{Sr}_{0.5}\text{Fe}_{0.5}\text{Rh}_{0.5}\text{O}_3$.

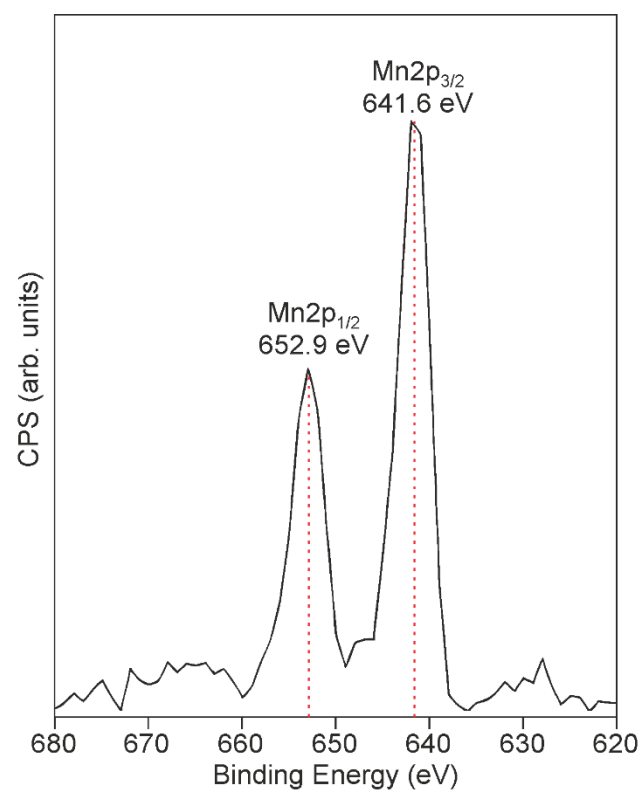


Figure S3. Mn 2P spectrum of $\text{La}_{0.5}\text{Sr}_{0.5}\text{Mn}_{0.5}\text{Rh}_{0.5}\text{O}_3$.

3. Magnetic behaviour of $\text{La}_{0.5}\text{Sr}_{0.5}\text{Mn}_{0.5}\text{Rh}_{0.5}\text{O}_3$.

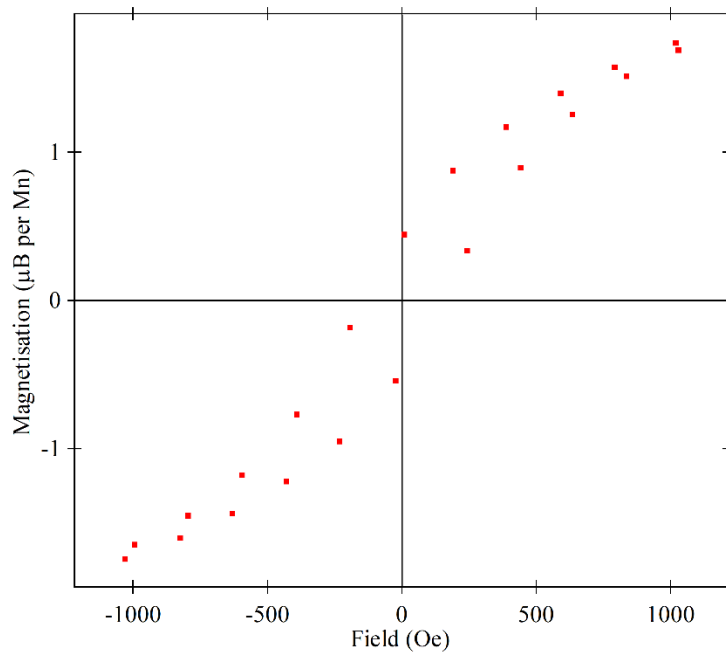


Figure S3. Expanded plot of magnetisation-field isotherm collected from $\text{La}_{0.5}\text{Sr}_{0.5}\text{Mn}_{0.5}\text{Rh}_{0.5}\text{O}_3$ at 5 K, showing the coercive field of the material is 190 Oe.