# Structure and Magnetism of the $Rh^{4+}$-containing perovskite oxides $La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O_3$ and $La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O_3$

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Supporting Information

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## 1. $^{57}$Fe Mössbauer Spectra of $La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O_3$

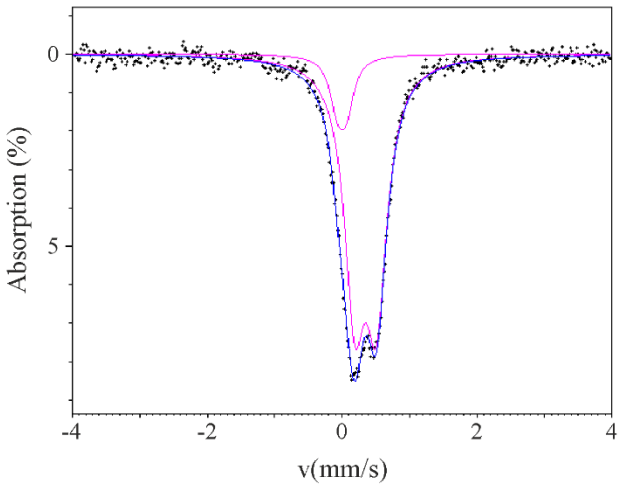


**Figure S1.** $^{57}$Fe Mössbauer spectrum collected from $La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O_3$ at room temperature. Fit with one doublet fixed at CS = 0 and one free to refine.

| 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 $La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O_3$ in which doublet 2 is fixed at CS = 0 and one is free to refine ($\chi^2$ = 0.694).

## 2. Fe 2P and Mn 2P spectra of $La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O_3$ $La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O_3$.

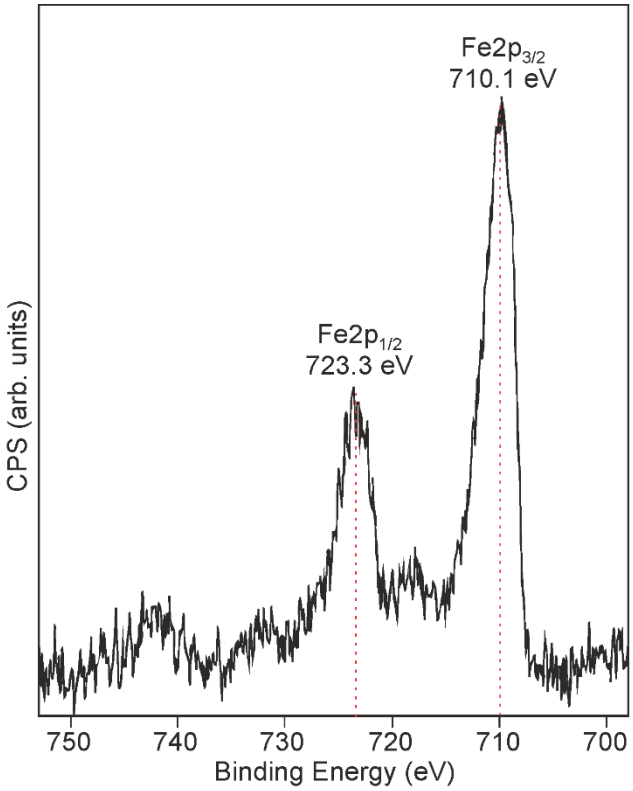


**Figure S2.** Fe 2P spectrum of $La_{0.5}Sr_{0.5}Fe_{0.5}Rh_{0.5}O_3$.

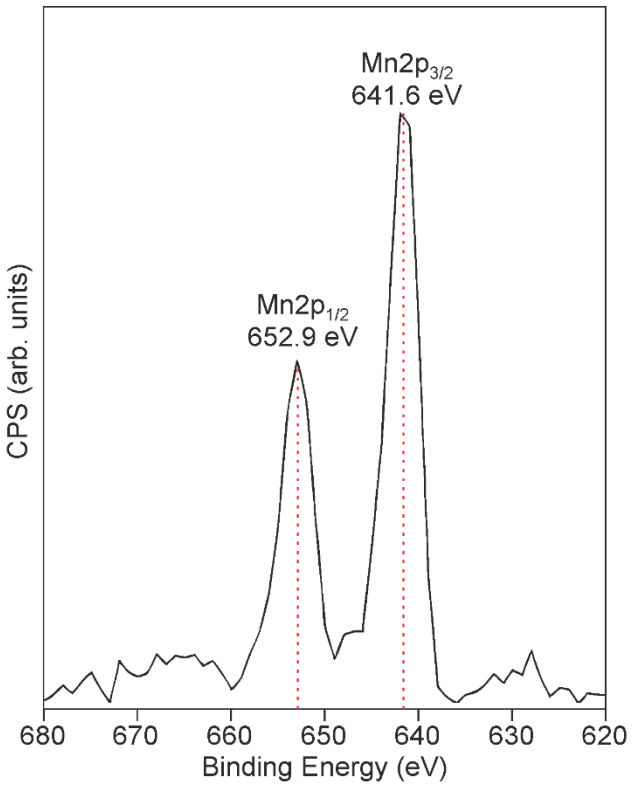


**Figure S3.** Mn 2P spectrum of $La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O_3$.

## 3. Magnetic behaviour of $La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O_3$.

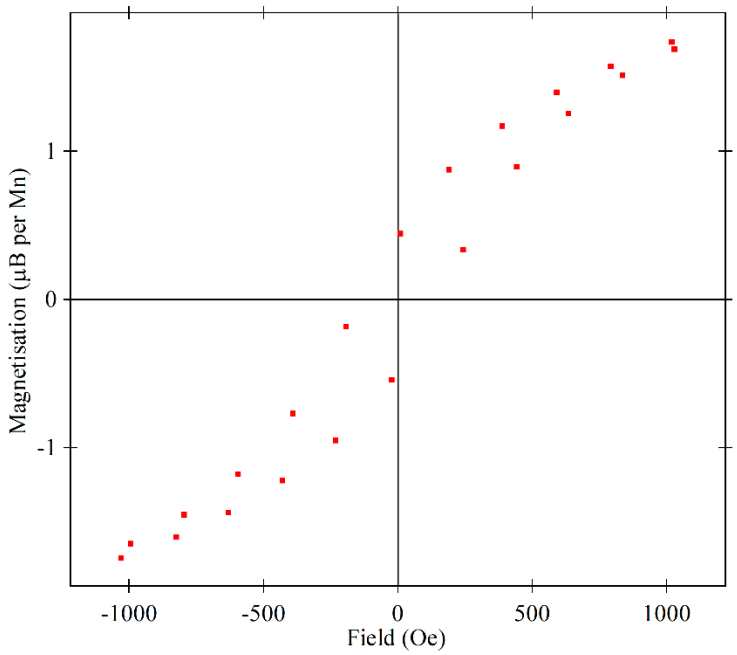


**Figure S4.** Expanded plot of magnetisation-field isotherm collected from $La_{0.5}Sr_{0.5}Mn_{0.5}Rh_{0.5}O_3$ at 5 K, showing the coercive field of the material is 190 Oe.