

Description of Additional Supplementary Files

File Name: Supplementary Data 1

Description: Supplementary Data file 1 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{La}_x\text{RuO}_4$ with $x = 0.11$ measured at 4 K.

File Name: Supplementary Data 2

Description: Supplementary Data file 2 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{La}_x\text{RuO}_4$ with $x = 0.07$ measured at 10 K.

File Name: Supplementary Data 3

Description: Supplementary Data file 3 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{La}_x\text{RuO}_4$ with $x = 0.07$ measured at 300 K.

File Name: Supplementary Data 4

Description: Supplementary Data file 4 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{Pr}_x\text{RuO}_4$ with $x = 0.07$ measured at 10 K.

File Name: Supplementary Data 5

Description: Supplementary Data file 5 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{Pr}_x\text{RuO}_4$ with $x = 0.07$ measured at 300 K.

File Name: Supplementary Data 6

Description: Supplementary Data file 6 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{La}_x\text{RuO}_4$ with $x = 0.04$ measured at 10 K.

File Name: Supplementary Data 7

Description: Supplementary Data file 7 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{La}_x\text{RuO}_4$ with $x = 0.04$ measured at 300 K.

File Name: Supplementary Data 8

Description: Supplementary Data file 8 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{Nd}_x\text{RuO}_4$ with $x = 0.04$ measured at 300 K.

File Name: Supplementary Data 9

Description: Supplementary Data file 9 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{Nd}_x\text{RuO}_4$ with $x = 0.04$ measured at 10 K.

File Name: Supplementary Data 10

Description: Supplementary Data file 10 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{Pr}_x\text{RuO}_4$ with $x = 0.04$ measured at 10 K.

File Name: Supplementary Data 11

Description: Supplementary Data file 11 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of $\text{Ca}_{2-x}\text{Pr}_x\text{RuO}_4$ with $x = 0.04$ measured at 300 K.

File Name: Supplementary Data 12

Description: Supplementary Data file 12 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of Ca_2RuO_4 measured at 10 K.

File Name: Supplementary Data 13

Description: Supplementary Data file 13 contains the CIF file reporting the crystal structure determined by single crystal neutron diffraction of Ca_2RuO_4 measured at 300 K.