Electronic Supporting Information for:

**High pressure synthesis of quasi-one-dimensional GdFeO$_3$-type perovskite PrCuO$_3$ with nearly divalent Cu ions**

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1. High pressure synthesis

We have performed high pressure oxygen annealing for the oxygen deficient perovskite PrCuO$_{2.5}$ at several temperatures 420-500 °C under a high pressure of 7.5 GPa. Since NaClO$_3$ does not release oxygen below 420 °C and the impurity phase of PrO$_2$ appears above 450 °C, we concluded that the optimum annealing temperature is about 440 °C at a high pressure of 7.5 GPa. Furthermore, we have confirmed that the oxidizer NaClO$_3$ should be mixed with the oxygen deficient perovskite PrCuO$_{2.5}$ to obtain the fully oxidized PrCuO$_3$.

The XRD patterns of PrCuO$_{2.5}$ and PrCuO$_3$, which was obtained by the high-pressure oxygen annealing for PrCuO$_{2.5}$ at 450 °C and 7.5 GPa, are shown in Fig. S1. All the peaks for PrCuO$_{2.5}$ can be indexed with an orthorhombic unit cell (Pbam) with $a = 5.584$ Å, $b = 10.353$ Å, $c = 3.828$ Å. The main peaks for PrCuO$_3$ can be indexed with an orthorhombic unit cell (Pbnm) with $a = 5.301$ Å, $b = 6.245$ Å, $c = 7.278$ Å. The 020 reflection with asterisk is superimposed by the main reflection from the impurity phase of PrO$_2$, which is absent in the sample obtained at 440 °C and 7.5 GPa.

![Graph showing XRD patterns for PrCuO$_{2.5}$ and PrCuO$_3$.](image)

Fig. S1: XRD patterns for PrCuO$_{2.5}$ and PrCuO$_3$ measured by a Cu Kα radiation.
2. Linear interpolation analyses for XANES spectra

As shown in Fig. 4, the pre-edge structure below 8995 eV, which corresponds to the quadruple transition, is prominent especially for CuO. In order to minimize the effect of the pre-edge structure on the estimation of the absorption edge energy, we chose the intersection of the horizontal line for the linear interpolation analyses as shown in the inset of Fig. 4 (the horizontal line is located at 70% of the maximum value). On the basis of the energies of intersections for CuO and LaCuO$_3$, we define that the absorption edge energies for Cu$^{2+}$ and Cu$^{3+}$ states are 8996.5 eV and 8997.6 eV, respectively. Provided that the oxidation state of Cu is linearly proportional to the absorption edge energy (the linear interpolation analysis)$^{25}$ the oxidation state of Cu in PrCuO$_3$ is calculated to be +2.2.