Supporting Information

High-Temperature Ferromagnetic Semiconductor with Field-Tunable Green Fluorescent Effect

Bowen Zhou[1,2], Qing Zhao[1], Zhehong Liu[1,2], Xudong Shen[1,2], Xubin Ye[1,2], Jiangjian Shi[1,2], Zhiyu Liao[1,2], Weipeng Wang[1,2], Zhiwei Hu[3], Hong-Ji Lin[4], Chien-Te Chen[4], Yuecheng Bian[5], Zhigao Sheng[5], Richeng Yu[1,2], Xianggang Qiu[1,2], Qingbo Meng[1,2], Zhi Li[6]*, and Youwen Long[1,2,7]*

Correspondence: Youwen Long (ywlong@iphy.ac.cn), Zhi Li (zhili@njust.edu.cn)

[1]Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China

[2]School of Physical Sciences, University of Chinese Academy of Sciences, Beijing 100049, China

[3]Max Planck Institute for Chemical Physics of Solids, Dresden 01187, Germany

[4]National Synchrotron Radiation Research Center, Hsinchu 30076, Taiwan

[5]Anhui Key Laboratory of Condensed Matter Physics at Extreme Conditions, High Magnetic Field Laboratory, Chinese Academy of Sciences, Hefei 230031, China

[6]School of Materials Science and Engineering, Nanjing University of Science and Technology, Nanjing 210094, China

[7]Songshan Lake Materials Laboratory, Dongguan, Guangdong 523808, China

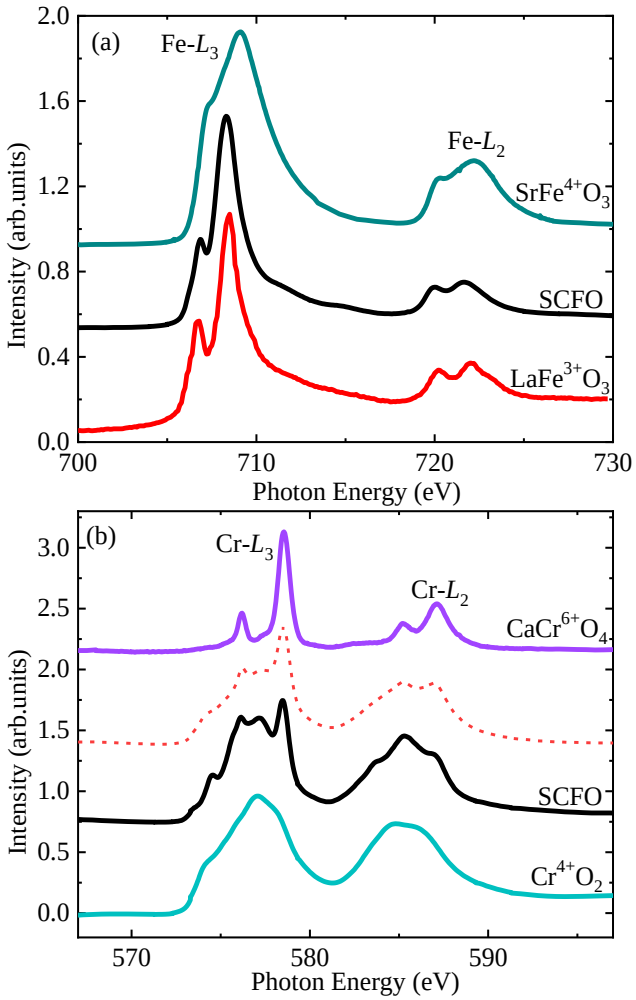

Fig. S1 X-ray absorption spectroscopy of, **a** the Fe-$L_{2,3}$ edges and, **b** Cr-$L_{2,3}$ edges of SCFO and the related references for comparison. The red dotted line in **b** shows the Cr-$L_{2,3}$ spectrum based on a Cr^{4+} and Cr^{6+} linear superposition with a 3:1 ratio that indicates an average $Cr^{4.5+}$ state.

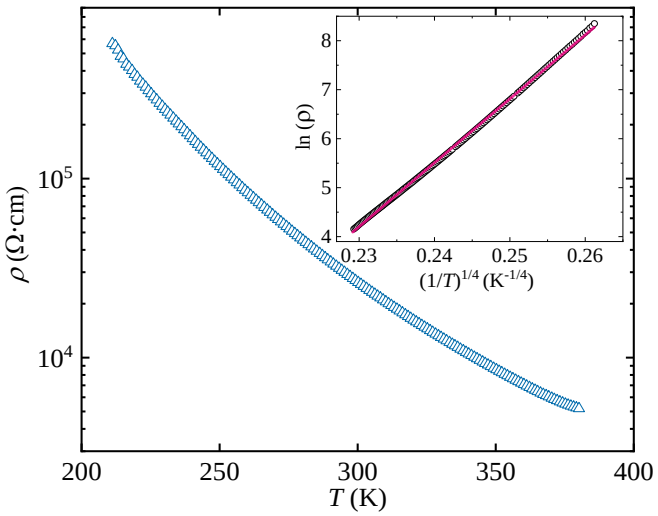

Fig. S2 Temperature dependence of resistivity for SCFO between 210 K and 380 K. The inset shows logarithm of ρ versus $T^{-1/4}$ plot corresponding to the 3D Mott variable-range hopping model.

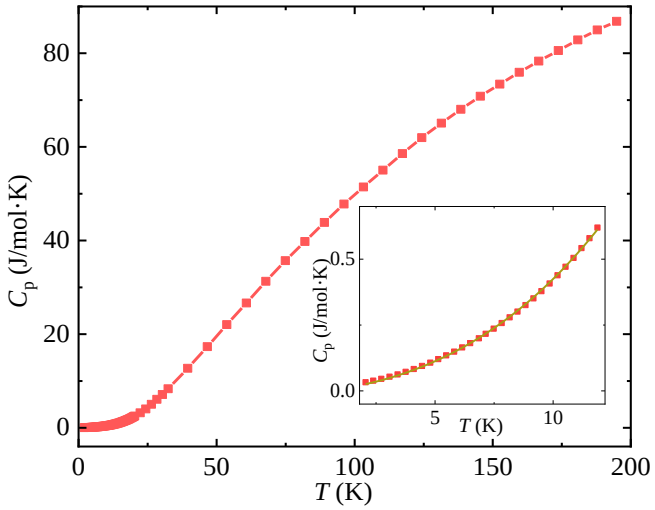

Fig. S3 Temperature dependence of specific heat below 200 K. The inset shows a good fitting with a formula $C_p = \alpha T^{3/2} + \beta T^3$ below 12 K.