

## Supplementary Information

### Tuning conductivity and magnetism of $\text{CuFe}_2\text{O}_4$ via cation redistribution

Ruyi Zhang,<sup>a</sup> Qibin Yuan,<sup>a</sup> Rong Ma,<sup>a</sup> Xiaoxing Liu,<sup>b</sup> Cunxu Gao,<sup>b</sup> Ming Liu,<sup>\*a</sup> Chun-Lin Jia,<sup>ac</sup> Hong Wang<sup>\*a</sup>

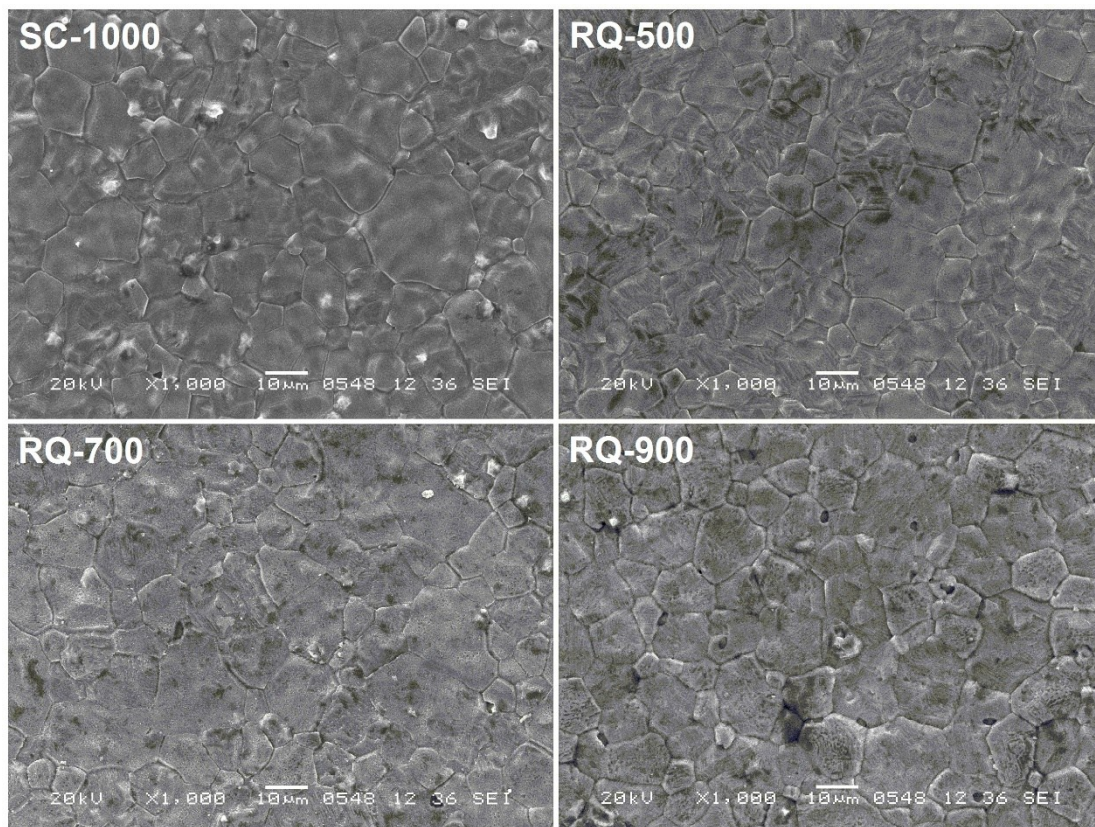
<sup>a</sup> School of Microelectronics & State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an 710049, China

<sup>b</sup> Key Lab for Magnetism and Magnetic Materials of the Ministry of Education, Lanzhou University, 730000 Lanzhou, China

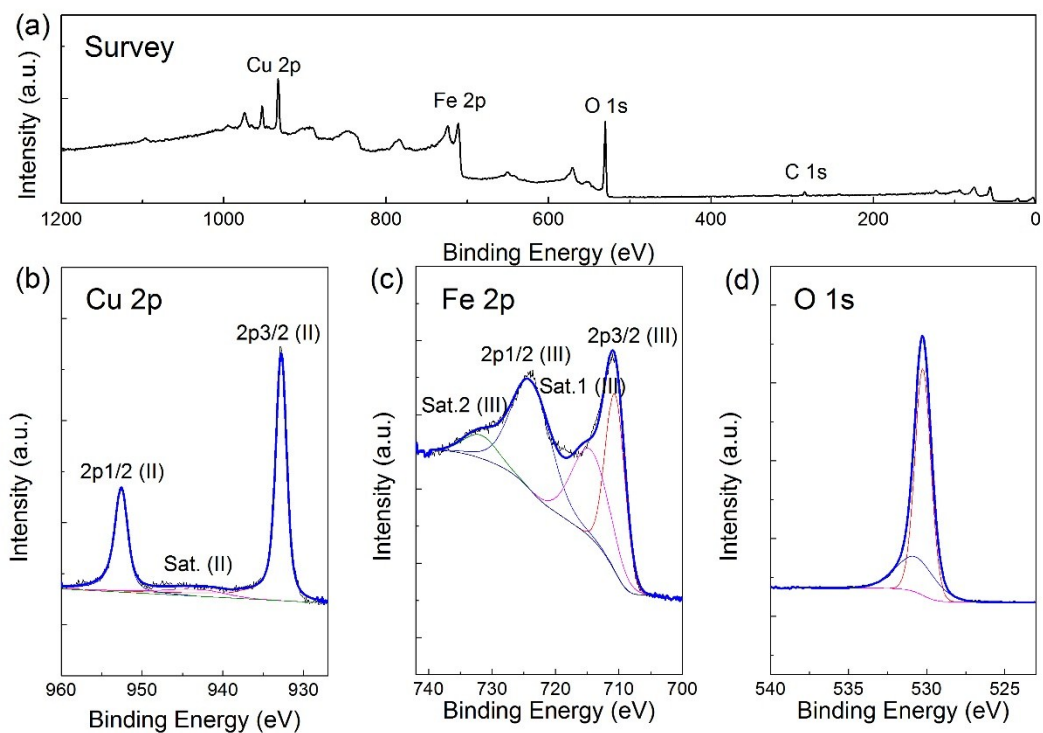
<sup>c</sup> Peter Grünberg Institute, Forschungszentrum Jülich GmbH, 52425 Jülich, Germany

**Table S1** The refinement parameters for all CFO samples

Sample	RQ/ SC-1000	RQ-500	RQ-700	RQ-900
Crystal system	Tetragonal	Tetragonal	Cubic	Cubic
Space group	I41/amd	I41/amd	Fd-3m	Fd-3m
Unit cell parameters	a=b=5.832 Å c=8.643 Å	a=b=5.882 Å c=8.549 Å	a=b=c=8.394 Å	a=b=c=8.389 Å
R factors	$R_{wp}=0.0717$ $R_p=0.0527$ $R_{exp}=0.0170$	$R_{wp}=0.0271$ $R_p=0.0211$ $R_{exp}=0.0190$	$R_{wp}=0.0117$ $R_p=0.0079$ $R_{exp}=0.0073$	$R_{wp}=0.0073$ $R_p=0.0055$ $R_{exp}=0.0058$
Atom Occupancy (Td site)	Cu: 0.1206 Fe: 0.8794	Cu: 0.1866 Fe: 0.8134	Cu: 0.2732 Fe: 0.7268	Cu: 0.3078 Fe: 0.6922
Atom Occupancy (Oh site)	Cu:0.4397 Fe:0.5603	Cu: 0.4067 Fe: 0.5933	Cu: 0.3634 Fe: 0.6366	Cu: 0.3461 Fe: 0.6539



**Fig. S1** The SEM images for all CFO samples. The average grain sizes for the RQ-0, RQ-500, RQ-700, and RQ-900 are around 10.8  $\mu\text{m}$ , 11.6  $\mu\text{m}$ , 11.5  $\mu\text{m}$ , and 11.1  $\mu\text{m}$ , respectively.



**Fig. S2** XPS Spectra for 900  $^{\circ}\text{C}$  quenched CFO samples. (a). Survey scan; (b) Cu 2p;

(c) Fe 2p; (d) O 1s. The XPS study shows the high temperature quenched CFO sample possess an almost ideal stoichiometry of 1:2:4 for the concentration of Cu, Fe, and O element. The core level peak fits indicate no  $\text{Cu}^+$  or  $\text{Fe}^{2+}$  ions form after performing rapid quenching process on CFO sample.