Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Reactive spark plasma assisted synthesis of metastable rare-earth ferrites with widely tunable charge ordering transfer properties

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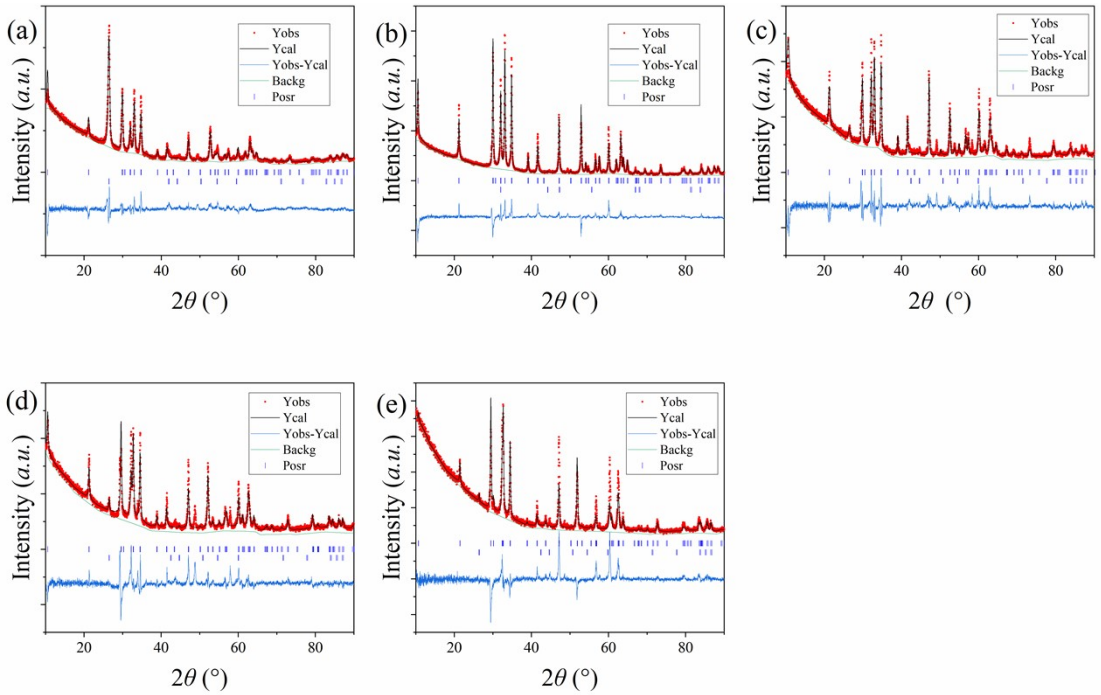

Fig. S1. (a-e) X-ray diffraction (XRD) and refinement of *Re*Fe_2O_4 bulk; (a) $LuFe_2O_4$; (b) $YbFe_2O_4$; (c)$TmFe_2O_4$; (d)$ErFe_2O_4$; (e) YFe_2O_4.

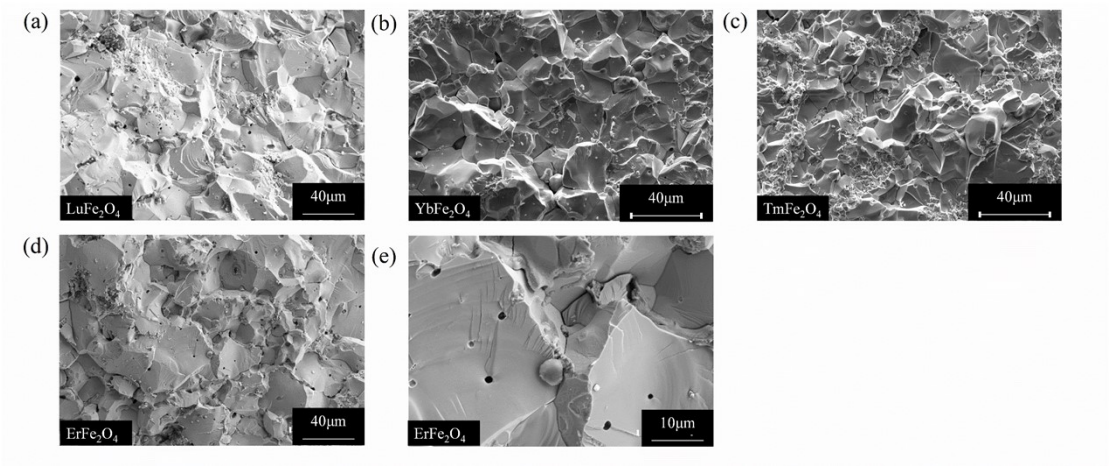

Fig. S2. Scanning electron microscope (SEM) images on cross section of *Re*Fe_2O_4 bulk; (a)$LuFe_2O_4$; (b) $YbFe_2O_4$; (c) $TmFe_2O_4$; (d-e) $ErFe_2O_4$.

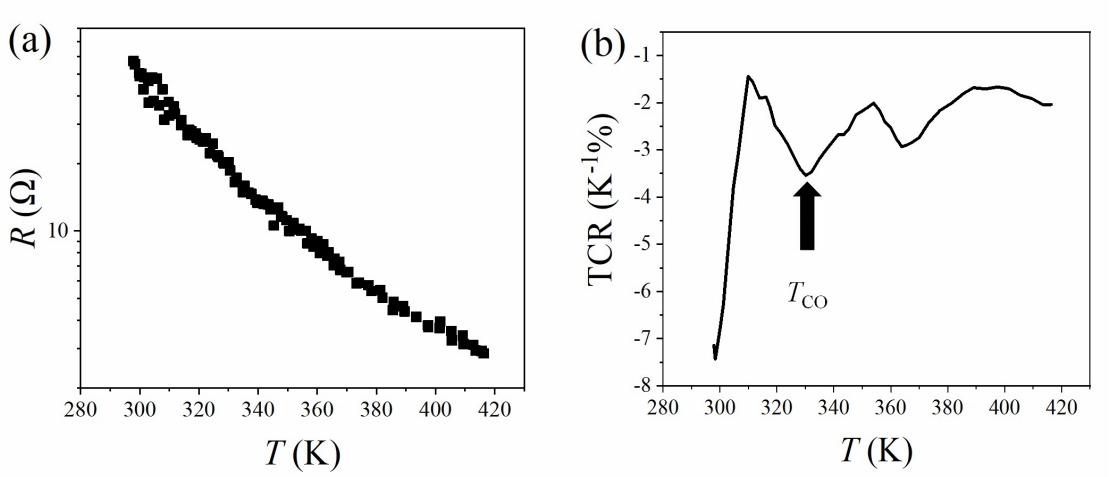

Fig. S3. Electric transport property of $LuFe_2O_4$. (a) Resistance as a function of temperature (R-T); (b) Temperature coefficient of resistance (TCR) of $LuFe_2O_4$ calculated from figure S3(a).

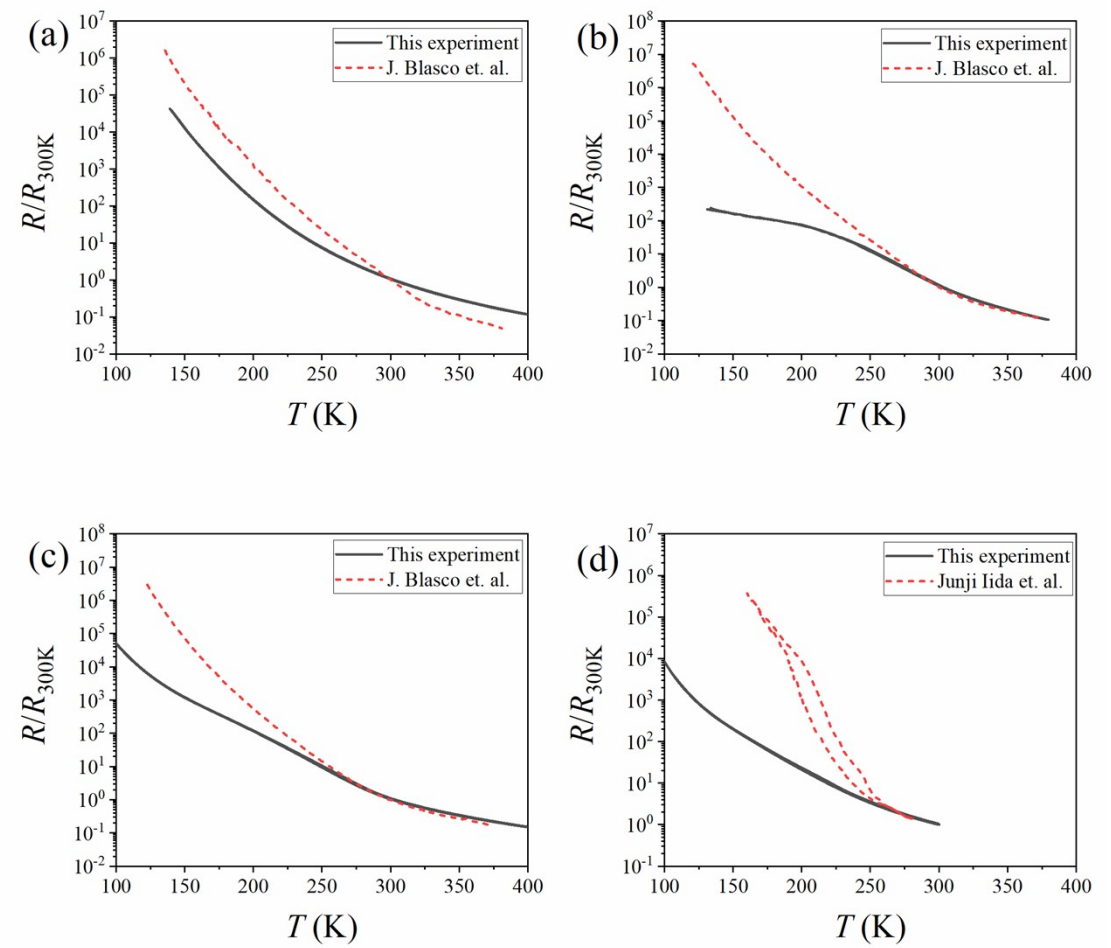

Fig. S4. Comparison on electric transport properties of *Re*Fe_2O_4 in this paper and reference [1, 2]. (a) $LuFe_2O_4$; (b) $YbFe_2O_4$; (c) $TmFe_2O_4$; (d) $ErFe_2O_4$.

Tab. S1. Multi-phase refinement of $ReFe_2O_4$ powder, the phase content is in mass fraction percentage

	$ReFe_2O_4$	$ReFeO_3$	Re_2O_3
$LuFe_2O_4$	96	4	0
$YbFe_2O_4$	100	0	0
$TmFe_2O_4$	89	11	0
$ErFe_2O_4$	83	14	0
YFe_2O_4	54	0	46

Tab. S2. Crystallite sizes and strain of $ReFe_2O_4$

	FWHM/°	D_{006}/nm	strain
$LuFe_2O_4$	0.15797	53	1.81E-03
$YbFe_2O_4$	0.15976	52	-9.00E-04
$TmFe_2O_4$	0.13671	61	-8.96E-04
$ErFe_2O_4$	0.12541	67	8.95E-04

Supplementary Reference

1. J. Blasco, S. Lafuerza, J. García and G. Subías, *Phys. Rev. B*, 2014, **90**, 094119.

2. Junji Iida, Midori Tanaka, Hijiri Kito and J. Akimitsu, *J. Phys. Soc. Jpn.*, 1990, **9**, 4190-4191.