

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Magnetodielectric Effects and Transport Study in LuFe<sub>2</sub>O<sub>4</sub> Single Crystal** TAE HWAN JANG, SANG YOUN PARK, eSSC & Dept. of Physics, POSTECH, Korea, HAI JOON LEE, SUN HEE KANG, Dept. of Physics, Ulsan Univ., Korea, TAE YEONG KOO, PAL, POSTECH, Korea, SUNG BAEK KIM, I-PEM & Dept. of Physics, POSTECH, Korea, ILL WON KIM, Dept. of Physics, Ulsan Univ., Korea, YOON HEE JEONG, eSSC & Dept. of Physics, POSTECH, Korea, SANG WOOK CHEONG, R-CEM and Dept. of Physics & Astronomy, Rutgers Univ., USA — Magnetic, dielectric, and magnetodielectric properties of geometrically frustrated mixed valance LuFe<sub>2</sub>O<sub>4</sub> single crystal are discussed to clarify the charge order based ferroelectricity and its coupling with magnetism. From the magnetization and dielectric constant measurement, a new anomalous temperature point  $T_{N'}$  ( $\sim 160$  K) in both magnetization and dielectric constant versus temperature curve below the ferrimagnetic transition temperature  $T_N$  ( $\sim 225$  K) has been observed. The sign of magnetodielectric effect (MDE) also changes from positive  $T > T_{N'}$  into negative  $T < T_{N'}$ . No field hysteresis in positive MDE temperature region was found. However a large hysteretic behavior in negative MDE below  $T_{N'}$ , with the same magnetic coercive field measured in M (H) curve was observed. This indicates a strong coupling between magnetism and ferroelectricity in the charge and spin frustrated ferrimagnetic LuFe<sub>2</sub>O<sub>4</sub> system.

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Date submitted: 02 Dec 2007

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