

Scanning Probe Microscopy Study on Multiferroic LuFe_2O_4

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1. 서 론

The multiferroic oxide LuFe_2O_4 has many interesting properties such as ferroelectricity, charge ordering, and ferrimagnetism. We investigated some of these properties by using Scanning Probe Microscopy (SPM) in the view point of domain structure.

2. 실험방법

We used Electrostatic Force Microscopy (EFM) and Magnetic Force Microscopy (MFM) to observe the domain structure of charge ordering and ferrimagnetism, respectively.

3. 실험결과

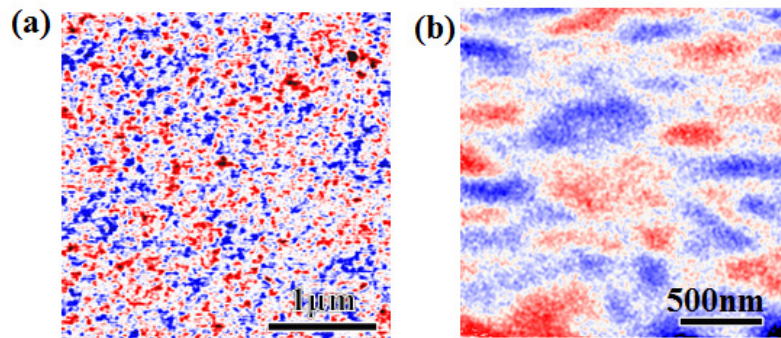


Fig. 1 (a) EFM image and (b) MFM image on the cleaved LuFe_2O_4 surface. The color scale in the EFM(MFM) is 20mV(1Hz).

In Fig. 1, the EFM and MFM images are shown. Both domains do not have certain patterns, which is different with conventional ferroelectric and ferromagnetic materials. The domain size in EFM(MFM) is about 50nm (200nm).

4. 고 찰

There might be many reasons for the peculiar domains of LuFe_2O_4 . Frustration due to geometry and structural defects would be plausible origins.

5. 결 론

We investigated LuFe_2O_4 with scanning probe microscope, and observed unconventional random-shaped domain structure. The detailed study for the origins of these domain will offer us good way to understand this material.

6. 참고문헌

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