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**Investigation of ferroelectric materials with scanning microwave microscope**<sup>1</sup> JEWOOK PARK, JONGHOON CHO, SANGYUN LEE, KOOKRIN CHAR, Seoul National University — By using scanning microwave microscope (SMM), we investigated dielectric properties of ferroelectric materials in high frequency regime (1.5GHz). Our SMM had the capability to measure a complex dielectric constant of the samples from the shift of resonant frequency ( $f_r$ ) and Q value of the probing resonator. In order to obtain non-linear dielectric constants of the ferroelectric samples, we applied oscillating electric field perpendicular to the sample and measured the 1<sup>st</sup> order derivative of the resonant frequency of the resonator ( $df_r/dE$ ) with respect to the applied field. In this way we could image the ferroelectric domain and the domain boundary structure of the triglycine sulfate single crystal using the  $df_r/dE$  and the  $f_r$  signal, respectively. Moreover we observed the ferroelectric responses from the tunable dielectric  $Ba_{0.6}Sr_{0.4}TiO_3$  thin film under the additional DC voltage bias to the film.

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