

MF(I)SFET 구조를 위한 강유전체 YMnO₃ 박막의 특성 연구

Characteristics of Ferroelectric YMnO₃ Thin Film for MFISFET Structure

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Ferroelectric thin films, such as Pb(Zr,Ti)O₃ and SrBi₂Ta₂O₉ have attracted much attention due to their application to nonvolatile RAMs. As another candidate, Norifumi Fujimura group have proposed ReMnO₃(Re:rare earth) thin films^[1]. Oxides of the elements Re(Ho, Er, Tm, Yb, Lu, Y) react with Mn to form the compounds ReMnO₃, which are ferroelectric^[2]. The ReMnO₃ thin films are excellent candidates for nonvolatile memory devices, because they have only one polarization axis, contain heavy and easily oxidized elements, and do not contain Bi and Pb.

Ferroelectric YMnO₃ thin films were prepared on P-type Si(100) substrates using a MOCVD at 500°C. The film thickness and microstructure were determined using the SEM and TEM. XRD was used to determine the crystal phase. RBS determined the composition of the YMnO₃ films. The dielectric properties were measured as a function of frequency with a Hewlett-Packard (4194A) impedance-gain phase analyzer. The current-voltage (I-V) measurements were performed with a Keithley 617 programmable electrometer. Top electrode of Pt was prepared at room temperature by dc sputtering using the shadow mask with a diameter of 0.15 mm.

[1] Norifumi Fujimura, Shu-ichiro Azuma, Nobuaki Aoki, Takeshi Yoshimura, and Taichiro Ito, *J. Appl. Phys.* **80**(12) 7084(1996).

[2] E. F. Bertaut, F. Forrat, and P. H. Fang, *C. Rend.* **256**, 1958 (1963).

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