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Characterizations of PZT/Interlayers for Pyroelectric Application

원미숙, 손영국*, 박철호*, 윤장희, 정의덕
한국기초과학지원연구원, *부산대학교 무기재료공학과

The PZT thin films were deposited on Pt/Ti/SiO₂/Si substrate by R.F. magnetron sputtering with Pb_{1.1}Zr_{0.53}Ti_{0.47}O₃ target for □ thermal type IR detector application. When the multilayers of PbO, TiO₂, and PbO/TiO₂ were inserted between PZT and Pt, the grain growth of the PZT thin films was considerably improved and had low-processing temperature. The crystal structure of deposited thin films was investigated by XRD. Compare to the pure PZT thin films, dielectric, ferroelectric, and pyroelectric properties of multilayer inserted PZT thin films were measured high value. From the XPS and GDS depth profile analysis, it was confirmed that PZT thin films and interlayers existed independently. In particular, PZT thin film deposited on the interlayer of PbO appeared the best pyroelectric properties($P=180.9 \mu\text{C}/\text{cm}^2\text{K}$, $F_p=12.7 \times 10^{-6} \text{ Pa}^{-1/2}$, $F_v = 0.018 \text{ m}^2/\text{C}$).