

Sol-gel 압전체 박막을 이용한 각속도 센서에 대한 연구
 (Study on Angular Rate Sensor using Sol-Gel PZT thin film)

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Piezoelectric or magnetostrictive materials, known as smart materials, have been researched widely for sensors or actuators in micro system technology.

In our research, thick sol-gel lead zirconate titanate($\text{Pb}(\text{Zr}_{1-x}\text{Ti}_x)\text{O}_3$) films were fabricated and their characteristics were investigated for angular rate sensor applications. The thickness of the PZT films is $1.5 \mu\text{m}$, which is required by a vibration angular rate sensor for a good actuation and sensing. The remnant polarization of the PZT films is $12.0 \mu\text{C}/\text{cm}^2$. The electromechanical constants of PZT thin film showed the value of susceptance(B) of $4800 \mu\text{s}$ at capacitance of 790pF . The PZT films were applied to the vibration angular rate sensor structure and the vibration of $1.78 \mu\text{m}$ in amplitude at the resonant frequency of 35.8kHz was obtained by driving voltage of 5Vp-p of bulk piezoelectric materials with out of phase signal through voltage and inverting amplifier. The oscillating output voltage was shown the values of 0.76V and 0.87V in outer/inner driving electrode at driving voltage of 5Vp-p by external actuation using a stacked piezo-actuator.

