

# Effect of the c-axis tilting angle in piezoelectric ZnO crystal on the performances of electroacoustic SAW sensors

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**Abstract :** This paper aims to study the effect of c-axis tilting angle of piezoelectric ZnO/Si on the performances of electroacoustic SAW sensors, the dispersion curves of phase velocity, the electromechanical coupling factor  $K^2$  and sensitivity to mass loading of Rayleigh and Sezawa modes are studied for different  $hZnO/\lambda$  and for different c-tilting angles (0,  $\theta$ , 90°). The effect of the tilting angle  $\theta$  on the performances of electroacoustic devices, is studied by finite element analysis. Based on the obtained results, SAW device is fabricated onto a ZnO/SiO<sub>2</sub>/Si multilayered structure. The obtained results show best performances and high sensitivity to gas and will contribute in enhancing the sensitivity and performances of SAW electroacoustic devices.

**Keywords :** surface acoustic waves, electroacoustic devices, Finite Element Analysis, Piezoelectric materials, c-tilted ZnO