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Special Issue: Proceedings of the 4th Asian Meeting
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Guest Editors: Xi Yao, Xiang Ming Chen, and Ce Wen Nan



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displacement ($>50 \mu\text{m}$) in a lower electric field ($\leq 10 \text{ kV/cm}$). However it can be found that in the same electric field the displacement is decreased with the Pt/Ti foil thickness increasing. The effect of substrate clamping on the PZT thick films resulted in this degradation. The vibrator made from the thinnest foil ($30 \mu\text{m}$) gives the largest displacement, $180 \mu\text{m}$.

4 Conclusions

Homogenous and crack free PZT (53/47) thick films up to $30 \mu\text{m}$ have been prepared from a MOD process on the flexible Pt/Ti foil substrates. The films exhibit excellent ferroelectric and piezoelectric properties. A perfect rectangular P–E loop of the thick film was present; the remnant polarization P_r is $35 \mu\text{C/cm}^2$; the coercive electric field E_c is 32 kV/cm . The estimated piezoelectric coefficient $d_{33, f}$ of the $24 \mu\text{m}$ PZT film on $30 \mu\text{m}$ Pt/Ti substrate is 448 pC/N (1 kHz), higher than that of the PZT thick films made by other methods. PZT piezoelectric vibrators with different sizes produced large displacement ($>50 \mu\text{m}$) in lower electric fields ($\leq 10 \text{ kV/cm}$). The vibrator made from the thinnest Pt/Ti foil present the largest displacement.

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