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Crystallographic Orientation Control in PZT Thin Films for Microelectromechanical Applications[1] BRYAN MAACK, BRADY GIBBONS[2], ASHLEY MASON, Oregon State University — Pb(Zr1-xTix)O3 (PZT) is widely used in ferroelectric and piezoelectric applications both in bulk and thin film form. As the piezoelectric response is strongly anisotropic, it is highly desirable to control the crystallographic orientation in order to maximize the displacement (for actuation) or charge generated (for sensing). Control of crystallographic texture in PZT thin films has been shown to be dependent on a variety of processing conditions including deposition method, substrate choice, chemical doping, etc. This work is focused on systematically exploring how processing conditions and substrate choice affect orientation in chemical solution derived PZT films. It was found that sputtered Pt/TiOx/SiO2/Si substrates provided a significantly improved template over evaporated Pt/Ti/SiO2/Si substrates. Additionally, alternative adhesion layers to Ti and TiOx resulted in improved chemical homogeneity within the PZT itself, which should lead to enhanced piezoelectric properties. Ongoing work to demonstrate improved piezoelectric properties will be presented.

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