Ultraviolet-assisted Cold Poling of $Pb(Zr_{0.52}Ti_{0.48})O_{-3}$ Films

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This paper discusses the advantages of a room-temperature poling procedure during exposure to ultraviolet light for $Pb(Zr_{0.52}Ti_{0.48})O_{-3}$ (PZT) films. The results of these experiments include the following: for 1.7-A mu m-thick chemical solution-deposited PZT films, the saturation photocurrent density after a 10 min white light exposure (190-1900 nm) (no DC bias field applied) increased up to 0.066 A mu A/cm(2) with increasing Cr thickness of top electrode in Cr/Pt bilayer electrodes. Furthermore, the d (33,f) piezoelectric coefficients for UV-poled samples were 40 and 20% higher than those achieved from field-only poling at either room temperature or 150 A degrees C. Additionally, the development of an internal bias field and pinching were investigated in major and minor polarization-electric field loops. It was found that ultraviolet illumination during the poling process produced photoinduced charge carriers that became trapped by local defects and/or grain boundaries in the films.