PHOTOCONDUCTOR-FERROELECTRIC STRUCTURE OF ULTRATHIN LANGMUIR-BLODGETT FILMS

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Langmuir-Blodgett deposition permits precise control of layer composition for the construction of multilayered and superlattice structures, such as alternating ferroelectric and nonferroelectric films, which can have enhanced or new properties. For example, the switching of such multilayered ferroelectric LB films can be more rapid, because we construct the whole film from narrow ferroelectric stripes divided by the nonferroelectric layers. In the case of photoconductive nonferroelectric layers we can expect the influence of the illumination on the ferroelectric switching due to the redistribution of the applied electric field $E$ between ferroelectric and nonferroelectric layers. There is also another possible mechanism, connected with screening of the ferroelectric polarization by the nonequilibrium carriers in the photoconductive layers. To investigate the effect of photoconductive layers, we have chosen vanadyl phthalocyanine (PcVO) and antrakhinon, due to the ease of deposition by the LB method, as was previously demonstrated with copper phthalocyanine (PcCu).

Hysteresis loops obtained in darkness and at illumination show the increase of polarization at illumination. At high external field, corresponding to the saturation of the polarization, this increase is small. At small external field, far from saturation, the illumination effect is large. The switching hysteresis loops were obtained by means of the Merz dynamic method using virtual-ground pulse measurement system.