

Abstract: Expansion of cellular polypropylene films through an increase in gas pressure and subsequent pressure release at elevated temperatures prior to charging is known to enhance the piezoelectric d_{33} -coefficient of the material. By means of a second pressure expansion the piezoelectric activity can be further increased by more than 40% in comparison with samples subjected to only a single expansion. The effectiveness of the double-expansion process must be attributed to the gain in thickness through the second expansion, following the charging and metallization processes. This thickness change causes a decrease in Young's modulus and thus an increase in d_{33} . Typical d_{33} -coefficients of 1400 pCN^{-1} at 0.01 Hz and about 500 pCN^{-1} at 25 kHz have been achieved.