Abstract:A number of experiments were conducted to further investigate the piezoelectric properties of cellular and porous electrets. The samples studied were films of cellular polypropylene (PP) and of porous polytetrafluoroethylene (PTFE), with thicknesses between 50 and 100 μ m. In some cases, multilayers consisting of one of these polymers plus an additional air or solid layer were also investigated. Results show that single layers of cellular PP, metalized on both sides, have piezoelectric d_{33} -constants of up to 350 pC/N while such samples of porous PTFE have much lower constants. Multilayers consisting of one cellular or porous layer plus an air layer exhibit significantly larger constants, exceeding 20,000 pC/N, due to the softness of the air. While the d_{33} -constant of the multilayer systems decreases with load due to the compression of the softer layer, cellular PP shows fairly constant d_{33} values for static pressures of up to 10 kPa thus indicating a rather large linear regime of the nonlinear stress-strain relationship. In this static pressure range a linear frequency response of the cellular foils was found if the foils were unstretched or under constant stress during the measurement. Stretching of the cellular PP foils results in a significant increase of the d_{33} -constants and thus represents an optimization method for the piezoelectric activity.