Abstract：Several layers of polytetrafluoroethylene and fluoroethylenepropylene films are fused such that small interfacial gas voids are formed between the layers. After proper charging and annealing, the fused multilayer films show large and thermally stable quasistatic piezoelectric $d_{33}$ coefficients of about 1000 pC/N which are subject to a minor reduction of 3% per day if exposed to 90 ℃. Depending on sample processing, the piezoelectric coefficient is relatively independent of applied pressure in the range up to 20 kPa and of applied frequency up to about 100 kHz. Thermally-stimulated discharge measurements indicate that the decay of the piezoelectric activity at higher temperatures is at least partially due to charge drift along the surfaces of the voids. A microphone built with the cellular ferroelectrets has a sensitivity of 3 mV/Pa at 1 kHz.