

Self-induced oscillation of the macropore diameter in n-type silicon

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Abstract

Electrochemical etching of n-type silicon in viscous-electrolyte containing HF for macropore formation has been employed to obtain deep pores at high growth rates. Under certain conditions, a new kind of macropore growth has been observed. The macropore diameters show self-induced anti-phase oscillations during specific phases of pore growth. This remarkable structural feature is not only interesting by itself, it is also the manifestation of a steady state of pore growth, a feature which has not been observed in any kind of electrochemically grown pores in semiconductors so far. This conclusion is mainly based on in-situ FFT (Fast Fourier Transform) voltage and illumination impedance spectroscopy measurements performed during the pore etching. Some voltage impedance data are presented here.