

Fast pore etching

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<https://doi.org/10.1002/pssa.200461104>

Abstract

The growth of silicon macropores under high current densities and high HF concentrations is studied. A new growth mode for porous Si has been found where pores resemble the so-called current line oriented pores previously discovered in InP. For the achievement of that the electrolyte had to be optimized in respect to the oxidation power of the electrolyte and its conductivity. All optimizations can be explained in the framework of the “Current-Burst-Model (CBM)”. The resulting pores show a strong self-organization tendency as well as the tendency towards strong (also externally visible) oscillations. The growth speed could be driven up to almost 500 $\mu\text{m}/\text{h}$ while still yielding pores whose roughness can easily compete with regular grown macropores. The pore diameters achieved span 50 to 3000 nm.