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Micro- and nanostructurization of surfaces - techniques and applications

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Keywords

silicon microtips, SiC microtips, porous silicon, transfer mold technique, field emission, carbon nanotubes

Abstract

In the paper some surface structurization methods are presented. Wet and/or dry etching, and thermal oxidation process have been used to form arrays of gated and non-gated sharp silicon microtips on a silicon wafer. A transfer mold technique (mold) has been applied to produce arrays of silicon carbide (SiC) microtips located on a glass wafer. The surface of the fabricated arrays has been also modified by thin film metal layers and carbon nanotubes. Current-voltage characteristics of electron sources with a cold cathode build on the base of microtips arrays are presented. A new application of silicon microtips arrays for biochemistry is shown. The process of electrochemical etching of silicon has been used to form porous silicon and porous silicon dioxide layers. Applications of the porous layers for chemical and biochemical analyses are presented. Microstructured surfaces modified by carbon nanotubes have been used to improve the field emission characteristics of electron sources, and to obtain a miniature light source.



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