Silicon Dioxide Micropillars for Sieving Fabricated by Macroporous Silicon-Based Micromachining

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(Received October 24, 2001; accepted February 14, 2002)

Key words: macroporous silicon, micromachining, electrochemical etching, sieving

In this paper, a new macroporous silicon-based micromachining technique and its application are reported. Macropores are formed on a silicon substrate by electrochemical etching in hydrofluoric acid. This etching technique has been used to fabricate regularly arrayed holes with a high aspect ratio (depth/width). In this work, the etching technique is extended to form not only holes but also silicon structures. The interesting points of this etching technique are that the etched width can be controlled during the etching without affecting the existing silicon structures, and the etched width less than the lithographic resolution can be achieved. Using these features, silicon dioxide pillars mutually separated by the space of 100 nm have been fabricated in a channel formed on a silicon substrate. These structures will be used for deoxyribose nucleic acid (DNA) separation.