

# Morphology Control of Silicon Nanocones Using Colloidal Lithography

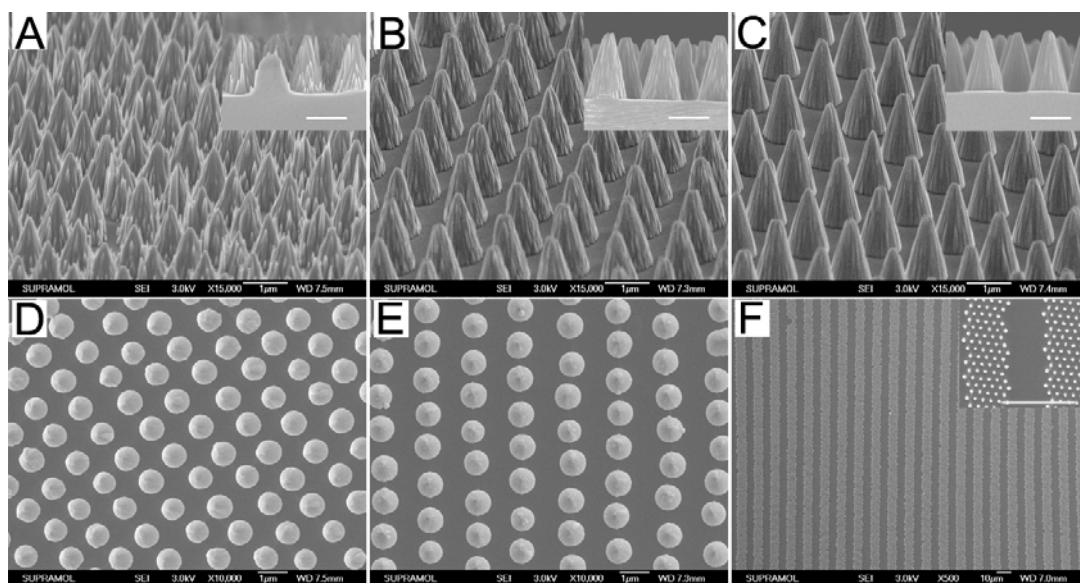
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Fabrication of silicon cone arrays with controlled morphology is of great importance when putting them into uses. Herein we present a simple method to fabricate ordered silicon nanocone arrays on silicon substrate using reactive ion etching with two dimensional silica colloidal crystals as masks. We show that with the increase of etching duration the shape of the etched silicon structures changed from cylinders to cones. The etching process can be divided into three stages, and the morphologies of the obtained structure in each stage are quantified. With this method not only hierarchical silicon cones but also those with smooth side walls can be obtained by controlling the etching duration. Moreover, this strategy is compatible with the methods we have established on controlling the arrangement of colloidal spheres [1-3], and thus silicon nanocone arrays with different periodicities, different lattice structures and different patterns can be prepared.



**Figure 1.** SEM images of as prepared silicon cone arrays with different periodicities (A-C), different lattice structures (D and E) and different patterns (F).

References:

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