

Reusable Colloidal-based Soft Photomask for Rapid Nanoscale Patterning

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Abstract:

In this presentation, we demonstrate a facile but reliable photolithographic technique, which allows the rapid fabrication of highly ordered nanostructure arrays by employing soft transparent polymer films as optical masks for the area-selective exposure of a photoresist upon flood UV illumination[1]. The soft polymer film either contains a monolayer of self-assembled (SAM) colloidal spheres inside at the near surface or has one side replicated from a SAM colloidal layer, in which the confined colloidal spheres or the surface textures can serve as lenses for light focusing[2]. The geometrical feature of the patterns, including the size, pitch, and even the shape, can be finely tuned by adjusting the mask design, exposure time and the thickness of the photoresist layer. Instead of a single usage, the polymer mask can be used numerous times without noticeable distortions in the achieved patterns. The obtained patterns could be used as deposition or etching mask, allowing easy pattern transfer for various applications[3,4].

References:

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