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Nano-patterning Using an Embedded Particle Monolayer as an Etch Mask TSUTOMU NAKANISHI[1], TOSHIRO HIRAOKA, AKIRA FUJIMOTO, KOJI ASAKAWA, Corporate Research and Development Center, Toshiba Corporation, 1, Komukai-Toshiba-cho, Saiwai-ku, Kawasaki, 212-8582, Japan — A new nano-fabrication technique using a self-assembled nano-particle monolayer as an etch mask is developed, which forms a homogeneous particle monolayer over a large area. A periodic nano-cone pattern, which acts as an antireflective structure, was fabricated onto the SiO2 substrate by transferring the nano-particles. A trapping layer of thermoplastic resin was formed on the substrate, and then nano-particles were spread to form a multilayer of particles. As it was heated, the particles of the bottom layer were spontaneously embedded in the trapping layer. Excess particles were washed away and the bottom layer remained. The substrate below was etched using the particle monolayer as an etch mask by CF4 reactive ion etching (RIE). As a result, conical nano-cone patterns were transferred over the entire surface of the substrate. Using this method, an antireflective structure with a two-dimensional grating known as a moth-eye surface was fabricated on the SiO2 substrate. Compared with the flat surface, the reflectivity was reduced more than 40%. This can be applied to large flat display.

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