

Anodized Aluminum Oxide/Polydimethylsiloxane Hybrid Mold for Roll-to-roll Nanoimprinting

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Two types (hard and soft) of the molds have been used in nanoimprint lithography (NIL) for a high throughput in a large area, and high-resolution parallel patterning. Although hard-mold have proven excellent resolutions and high temperature strength, cracks of mold often occurs, and high pressure is needed. On the other hand, although soft-mold can operate at lower pressure without cracks, it has poor pattern resolution. Here, we introduced a novel hybrid mold of anodized aluminum oxide (AAO) template chemically connected with polydimethylsiloxane (PDMS) layer. Due to the flexible nature of PDMS, we could obtain various nanostructured polymers on not only flat substrate but also curved substrate under relatively lower pressure. Furthermore, the hybrid mold is successfully used for roll-to-roll imprinting for the fabrication various nanostructured polymers in a large area.