

Fabrication of Nano-micro hybrid pattern using Anodic Aluminum Oxide template and resins

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In this study, We fabricated nano-micro hybrid pattern by nanoimprint lithography using porous material and resin like anodic aluminum oxide.¹

A polymer resin was coated between master(AAO filter) and substrate(PET film), roller pressed, UV-cured. Since the AAO template is fragile, we use Etchant (Na OH) to remove AAO. Fabricated 1st replication is made up of bundle and a bundle of nanowires shows a micro-pattern. The resulting structure was subjected to various surface treatments to investigate the surface behavior and wettability. UV-Ozone treatment and Octadecyltrichlorosilane (OTS) coating are implemented to adjust surface.²

UV-Ozone treatment is well known for it can enhance surface hydrophilicity but, UV-Ozone treatment can enhance surface hydrophobicity because UV energy affects the nanowire surface and change the surface structure. OTS coating can improve the hydrophobicity of the surface. These surface treatment can control surface energy, and these treatments help to deal with parting process.

We fabricated 2nd replication using various UV cured resin after surface treatments. In this way, 2nd replication was created with the reverse phase structure of 1st replication. And then, The 1st replication and 2nd replication were compared and analyzed using the Scanning Electron Microscope(SEM).

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¹ Thongmee, S., et al. "Fabrication and magnetic properties of metallic nanowires via AAO templates." *Journal of Magnetism and Magnetic Materials* 321.18 (2009): 2712-2716.

² Najafi, Ebrahim, et al. "UV-ozone treatment of multi-walled carbon nanotubes for enhanced organic solvent dispersion." *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 284 (2006): 373-378.

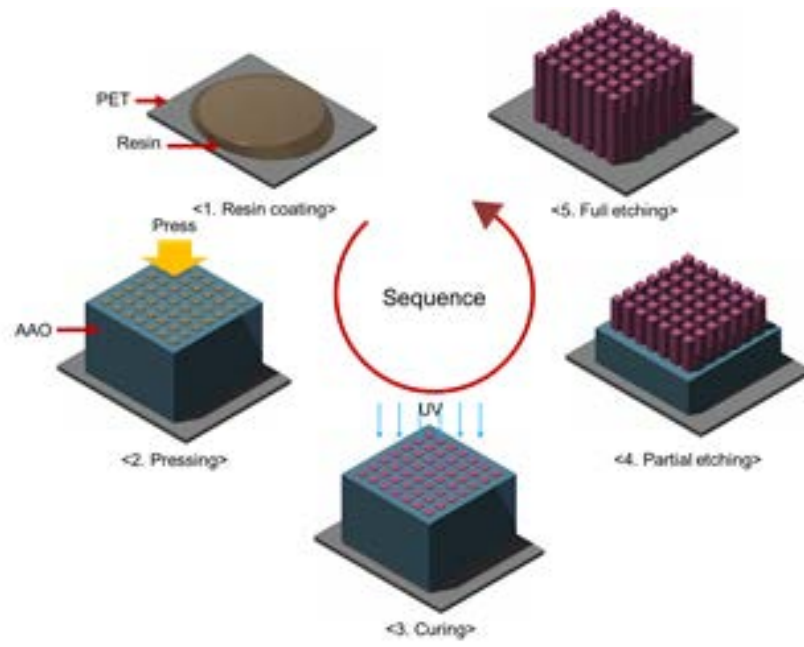


Figure 1: Schematic of UV nano imprint lithography and etching process