

Inkless Micro-Contact Printing (I μ CP)

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Polydimethylsiloxane (PDMS) has been the material of choice for various soft lithographic processes, and has also been investigated as an insulation material in outdoor high voltage application. In micro-contact printing (μ CP), which is one of soft lithographic methods, it's now well documented in the literatures that "contaminant" PDMS molecules is left on substrate, as well as 'ink' molecules. Contaminant PDMS residue after μ CP has been believed to be due to the migration/out-diffusion of "small, uncured PDMS oligomers" in literatures.

In this work, we carried out gel-permeation chromatography (GPC) analysis on the recovered PDMS material. We found that, contrary to common belief, the recovered PDMS material is *NOT small* molecules, compared to starting oligomeric PDMS. Rather, they have ~10 times higher molecular weight than the pristine oligomers. In addition to this new finding, we also suggest a novel surface patterning method, termed inkless micro-contact printing (I μ CP), by exploiting the hydrophobic recovery phenomenon of PDMS stamp. In the I μ CP, patterned PDMS stamp is simply made contact with substrate, leaving the recovered PDMS material as an 'ink' pattern on substrate. Finally, possible applications of I μ CP will be discussed.