

Nanostructured pattern replication on transparent polycarbonate by plastic injection

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Micrometer-sized motifs have been patterned by focused ion beam (FIB) on diamond-like carbon (DLC)-coated stainless steel mould surfaces [see Fig. 1(a)] and replicated to surfaces of polycarbonate (PC) pieces by plastic injection. Figures 1(b) and (c) show atomic force microscopy (AFM) images of a cross patterned on the DLC coating of the mould (negative) and the resulting cross on the injected piece (positive), respectively. Injection was performed at a mould temperature of 90°C and injection pressure of 50 bar with the channel at 280°C. From Fig. 1(c) it can be inferred that objects with dimensions in the nanometer range can be readily fabricated indicating that the mass-production injection process is suitable for the patterning of nanometer-sized features.

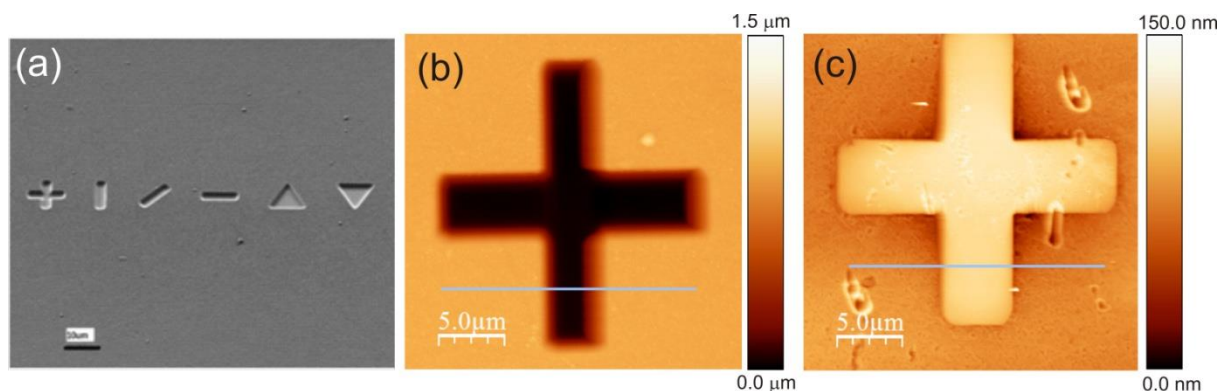


Fig.1. (a) Scanning Electron Microscopy image of the FIB patterns prepared on a DLC-coated mould. The overall coating thickness was 3.1 μm consisting of a gradient Cr-N-C adhesion multilayer and a 1 μm thick amorphous carbon layer with a hydrogen content of ca. 18 %. AFM images of (a) a cross patterned on the mould and (c) the transferred cross to the PC injected piece.

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