

Fabrication of Ceramic Line Nano Pattern from ceramic precursors via UV-imprint lithography

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The SiC-based ceramic nanopatterns were prepared by placing PDMS mold from DVD master on the spincoated polyvinylsilazane (PVS) or allylhydridopolycarbosilane (AHPCS) as ceramic precursors to fabricate line pattern via UV-nanoimprint lithography (UV-NIL), and subsequent pyrolysis at 800°C in nitrogen atmosphere. As the dimensional change of polymeric and ceramic patterns was comparatively investigated by AFM and SEM, the shrinkage in height was 38.5% for PVS derived pattern and 24.1% for AHPCS derived pattern while the shrinkage in width was 18.8% for PVS and 24.1% for AHPCS. It indicated that higher ceramic yield of the ceramic precursor occurred less shrinkage, and also the strong adhesion between the substrate and the pattern caused anisotropic shrinkage. Finally this preliminary work suggests that NIL is a promising route for fabricating ceramic MEMS devices, with the development on the shrinkage control.