

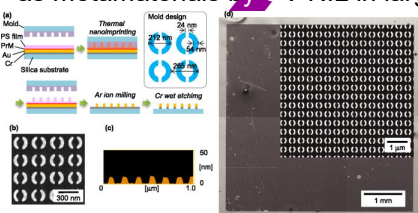
Our group has dedicated to pursue scientific principles for molecular control of interface function occurring at polymer/other material interfaces and to put them into practice in nanoimprint lithography promising as a next generation nanofabrication tool. We are developing advanced photo-functional materials such as sticking molecular layers for "fix by light", UV-curable resins and antisticking molecular layers for "preparation by light", fluorescent resist materials for "inspection by light", and hybrid optical materials "available to light" and new research tools such as mechanical measurement systems to evaluate release property of UV-curable resins. Our research aims at creating new devices to control photon and electron.



Ar ion milling instrument

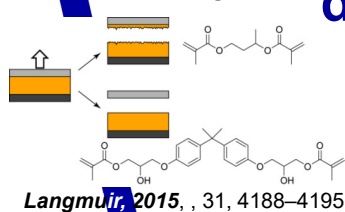


Formation of nanosized metal structures as metamaterials by UV-NIL in large area

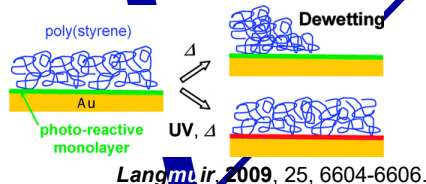


Appl. Phys. Lett., 2013, 103, 071104 (1-4).

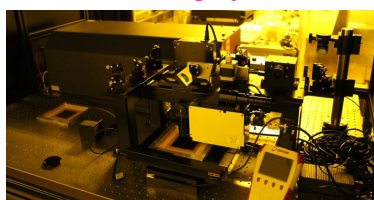
Low pollution of fluorinated mold surfaces in UV-NIL



Formation of a photoreactive chemisorbed monolayer for suppressing polymer dewetting



laser drilling system

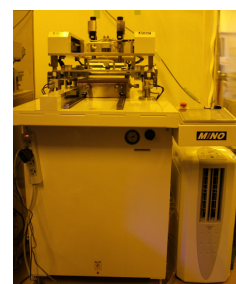


Preparation of polymer through-hole membranes by pulsed laser drilling

laser materials processing

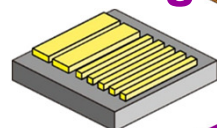
resin printing

screen printing system

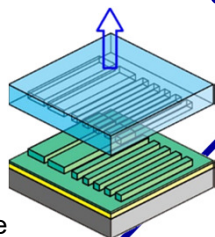


Jpn. J. Appl. Phys., 2016, 55, 06GM01.
Position selective placement of resin dots with controlled volume by screen printing process

etching



demolding

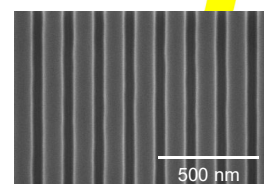


nanoimprint lithography

@ Nakagawa lab.

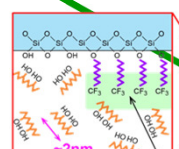
mold designing

Formation of a silica template by electron beam lithography

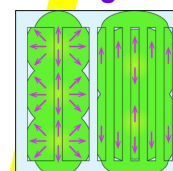


resin filling

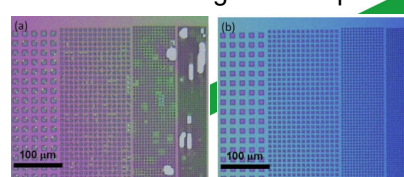
surface modification



fluid migration



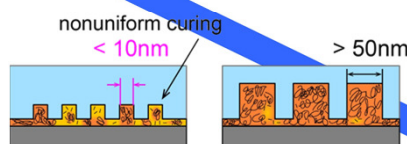
Bubble-defect free UV nanoimprinting under condensable gas atmosphere



UV nanoimprinting system



uniform curing of a photo-curable resin during UV nanoimprinting in single-nanometer regime



development of UV-curable resin

real-time observation system for resin filling

