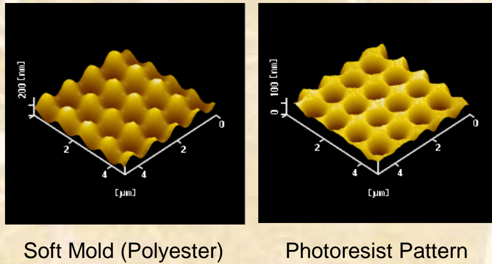
Nanoimprint Lithography Using Novolak Photoresist and Soft Mold at Room Temperature

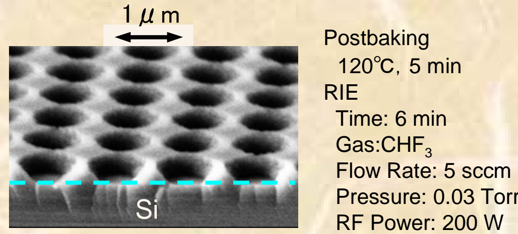
Takahiro Numai, Takeshi Koide, Takashi Minemoto, Hideyuki Takakura and Yoshihiro Hamakawa
Ritsumeikan University, College of Science and Engineering
1-1-1, Noji-Higashi, Kusatsu, Shiga 525-8577, Japan
Phone: +81-77-561-5161 E-mail: numai@se.ritsumei.ac.jp

1. Soft Mold and Obtained Photoresist Pattern



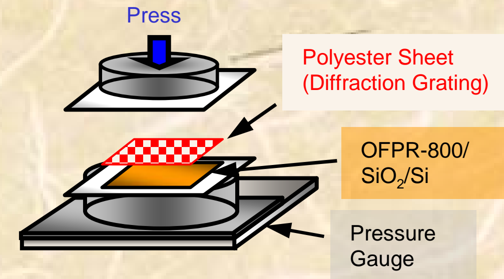
Soft Mold (Polyester) Photoresist Pattern

2. SEM of SiO_2 Pattern after RIE

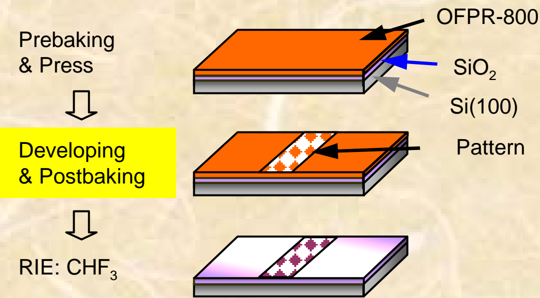


Postbaking
120℃, 5 min
RIE
Time: 6 min
Gas: CHF_3
Flow Rate: 5 sccm
Pressure: 0.03 Torr
RF Power: 200 W

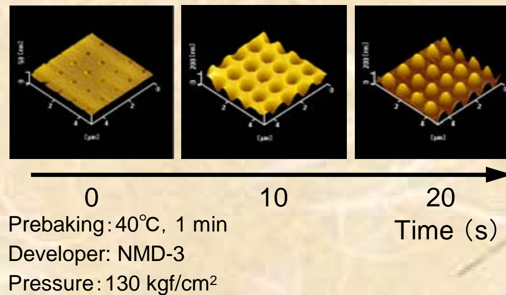
3. Fabrication Apparatus



4. Fabrication Process

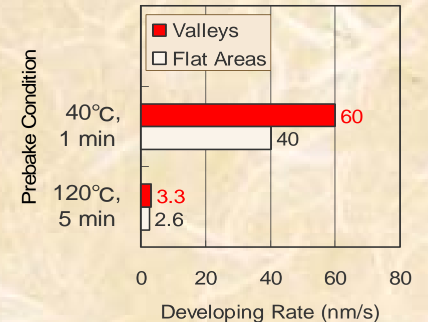


5. Dependence on Developing Time



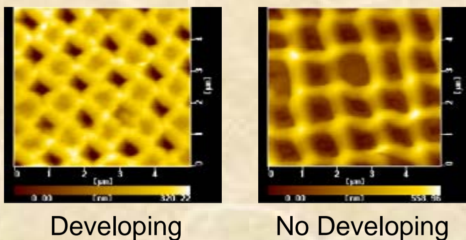
Prebaking: 40℃, 1 min
Developer: NMD-3
Pressure: 130 kgf/cm²

6. Developing Rate



7. Effect of Developing

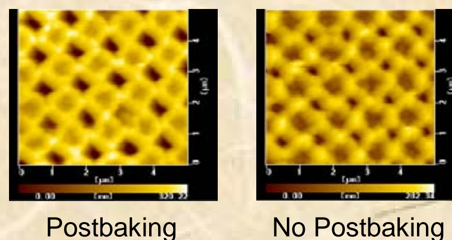
AFMs of Photoresist Surfaces after RIE



Developing No Developing

8. Effect of Postbaking

AFMs of Photoresist Surfaces after RIE



Postbaking No Postbaking

9. Summary

Photolithography

Nanoimprint Lithography with Hard Mold at High Temp.

Nanoimprint Lithography with Soft Mold at Room Temp.