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Lithographic Procedure for Ni Gate Patterning Using Bi-Layer Resist (Shipley S1813 and SU-8 2001)

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1. Pre-bake sample on hot plate @ 140°C for 4-5 min
2. Let sample cool in air for 5 min
3. Set one of the hotplates to 130°C
4. Positive PR: Shipley S1813 resist:
   a) Spin PR @ 2000rpm for 30 sec
   b) Bake on hotplate @ 130°C for 1 min
   c) Let sample cool in air for 5 min
   (PR thickness: 1.5μm)
5. Set the hotplate temperature; hot plate #1: 70 °C and hotplate #2 @ 120 °C

6. Negative PR: SU-8 2001 resist:
   a) Spin @ 3000 rpm for 30 sec
   b) Bake on hotplate #1 @ 70°C for 2 min
   c) Transfer sample to hotplate #2 directly @ 120°C for 2 min
   d) Let sample cool in air for 5 min
   (Combined PR thickness: 1.2-1.4μm)

Note: Spread SU-8 resist on the ENTIRE wafer, because the area that is NOT covered with SU-8 resist will be removed at the development step.

7. Exposure UV light (90 mJ/cm^2)
8. Post-exposure bake on hotplate:
   a) Bake @ hotplate #1: 70°C for 2 min
   b) Transfer sample to hotplate #2: 120°C for 2 min
   c) Let sample cool in air for 3-4 min

9. Develop samples using SU-8 Developer for 60 sec
10. Transfer sample to beaker containing IPA for 5 sec
11. Rinse in IPA for 5 sec
12. Blow dry sample with N_2 gun

13. Load samples into the E-beam evaporator immediately

Note: After development, quickly load samples into the vacuum chamber for e-beam evaporation (<10 min), otherwise, Ni electrodes will peel off. If you are working with two to three samples, perform steps no. 1 to no. 8 first and develop all samples at the same time (in step no. 9). After step no. 9, load them into the e-beam evaporator immediately (<10 min).