

How a Run Sheet looks like!

All activities which should be done in the HNF require a proposal, which is evaluated by the Technical Commission (TecCom) in advance of starting work in the HNF.

The Run Sheet answers the question:

- Size of the Sample?
- Basic Material
- Stratification /Layer sequence
- Previous Processing?
- Used Chemicals?
- Further Processing?

An examples for a Run Sheet

Topic: Realization of apertures on Si₃N₄ membranes

Starting material:

100mm Silicon (100) wafers polished from both sides.

Process:

1. Cleaning samples: Acetone/IPA/DI
2. Marker definition:
 - a. Lithography and subsequent etch of marker structures. Structure size several μm , etching depth $\sim 500\text{nm}$.
 - b. Resist coating: UV26, 4000rpm ($\sim 1.7 \mu\text{m}$); Soft bake: 130°C, 60s hot plate;
 - c. Exposure: dose to be tested, Post Exposure Bake: 110°C; 60s hot plate;
 - d. Development: MF-24-A 60s
 - e. RIE: anisotropic etching of 500nm of Si; side wall angle $>75^\circ$
 - f. Resist stripping: O₂-Plasma in RIE chamber
3. Cleaning: H₂SO₄/H₂O₂ (2:1), 10 min, 60°C, Ultra Sonic
4. LPCVD: Deposition of 300nm Si₃N₄ (both sides)
5. Lithography backside: opening of Nitride mask on backside
 - a. Resist coating: UV26, 4000rpm ($\sim 1.7 \mu\text{m}$); Soft bake: 130°C, 60 s hot plate;
 - b. Exposure: dose to be tested
 - c. Post Exposure Bake: 110°C; 60s hot plate;
 - d. Development: MF-24-A 60s
6. Etching of nitride mask: RIE of Si₃N₄(CHF₃/CF₄)
7. Resist stripping: O₂-Plasma in RIE chamber
8. Cleaning: H₂SO₄/H₂O₂(2:1), 10 min, 60°C, Ultra Sonic
9. Wet etch of Silicon:
 - a. HF-Dip: remove SiO₂ on Si with 1 min HF 1%
 - b. KOH etch: etching of Si; time dependent etching; stop before Si₃N₄. Parameters to be clarified
 - c. Remove Si₃N₄ from backside: RIE CHF₃/CF₄
 - d. HF-Dip: remove SiO₂ on Si with 1 min HF 1%

- e. KOH etch: etch through wafer; stop on Si_3N_4 on front side. Parameters to be clarified.
- 10. Deposit 30nm Au on front side
- 11. Deposit 30nm Au on back side
- 12. FIB: etch $2\mu\text{m}$ holes in Au/ Si_3N_4 /Au membrane

Schematic process flow

