Lecture 9: Bulk Micromachining I

- Announcements:
- HW#2 due Thursday, 2/21 at 9 a.m.
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- Today:
- Reading: Senturia Chpt. 3, Jaeger Chpt. 11, Handouts: "Surface Micromachining for Microelectromechanical Systems", "Etch Rates for Micromachining—Part II"
- Lecture Topics:
  - Polysilicon surface micromachining
  - Stiction
  - Residual stress
  - Topography issues
  - Nickel metal surface micromachining
  - 3D "pop-up" MEMS
  - Foundry MEMS: the "MUMPS" process
  - The Sandia SUMMIT process
- Reading: Senturia Chpt. 3, Jaeger Chpt. 11, Handouts: "Bulk Micromachining of Silicon"
- Lecture Topics:
  - Bulk Micromachining
  - Anisotropic Etching of Silicon
  - Boron-Doped Etch Stop
  - Electrochemical Etch Stop
  - Isotropic Etching of Silicon
  - Deep Reactive Ion Etching (DRIE)
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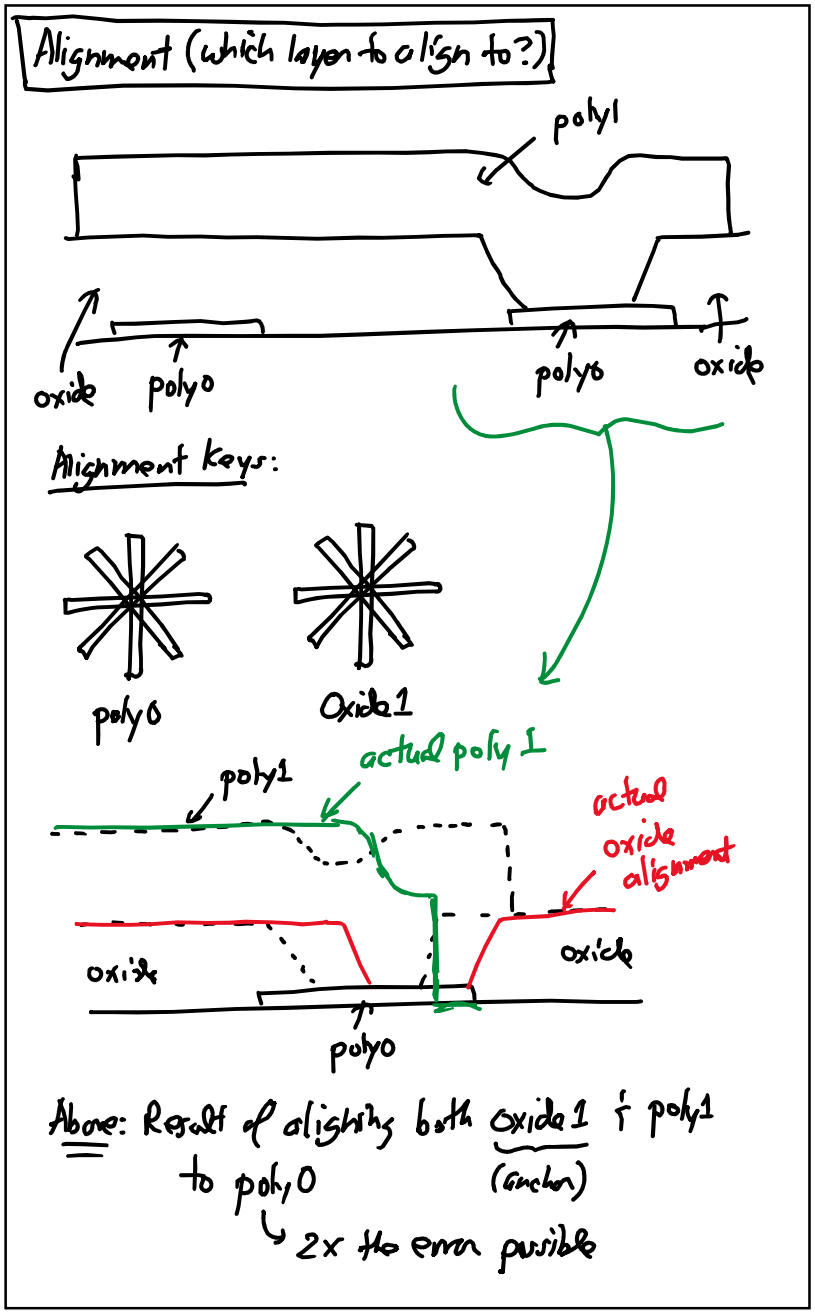
- Last Time:
- Finished stiction in Module 5
- Now, continue in Module 5 with a 1st pass on stress

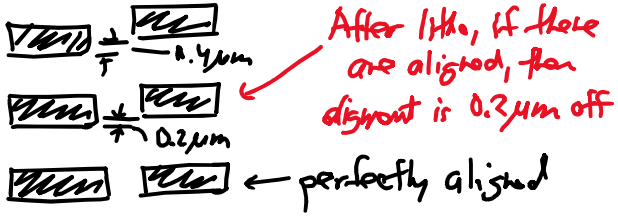


Best alignment option:

① Align oxide1 → poly0
② Align poly1 → oxide1

} good only 1x error

Knowing how good the alignment is by eyeballing:



After litho, if these are aligned, then diagram is 0.2μm off

Very Important to have diagnostics like these on your layout