Lecture 9: Bulk Micromachining I
• Announcements:
  • HW#2 due Tuesday, 2/25 at 8 a.m.
  • Module 6 online
• Today:
  • Reading: Senturia Chpt. 3, Jaeger Chpt. 11, Handouts
  • 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)
• Last Time:
  • Through 3D pop-up MEMS in Module 5
  • Now, continue in Module 5
Alignment Diagnostic

If after lithography:
- There is up: ΔX > 0.2 μm
- There is up: ΔX > 0.2 μm
- ΔX = 0.2 μm

$\frac{n}{m}$ exposed
$\frac{n}{m}$ unexposed

Fluidic Self-Assembly

Top View
- Hydrophobic
- Hydrophilic surface

Water
- Hydrophobic
- Water