

EE245 Introduction to MEMS Design

Fall 2003

Homework 1

Due 9/4/03 at 5 pm. The box is between the corridor and the Moore room on the 2nd floor of Cory Hall.

1. For the following journals:

- Sensors and Actuators (A & B)
- Journal of Microelectromechanical Systems
- Journal of Micromechanics and Microengineering

Find this information:

- a. Where can you get the full-text articles online?
- b. Summarize the topics covered in the journal in one sentence.

2. For the following conferences that cover MEMS and/or microsystems, find out (a) five of the main topics covered, (b) how often the conferences are held, (c) where the most recent one was held, and (d) optional – where the next one will be held and whether you want to be there.

- International Conference on Solid State Sensors and Actuators (Transducers '03)
- Solid State Sensor and Actuator Workshop (Hilton Head '02)
- MicroElectroMechanical Systems Workshop (MEMS '03)
- MicroTotalAnalysis Systems (microTAS '03)

3. Show that the angles between the $\{110\}$ and $\{111\}$ planes of a silicon (100) wafer are 35.26° , 90° and 144.74° .

4. With KOH, the etch selectivity between the $\{100\}$ and $\{111\}$ planes is 400:1, not infinite. Therefore, the sidewalls of a pit etched in a (100) wafer will be very close to the $\{111\}$ planes but not exactly parallel to them. (a) What angle do they really make? (b) What etch ratio would be needed to make 45° sidewalls?

5. Deep reactive ion etching in silicon can be done using the Bosch process. Explain what you see in the scanning electron micrographs (SEMs) below and why these effects occur.

