



**EECS 143  
Microfabrication  
Technology**

Department of Electrical Engineering and  
Computer Sciences  
University of California, Berkeley

**Week #12 Quiz—MEMS Processing &  
Characterization**

Name \_\_\_\_\_ Section \_\_\_\_\_ Date \_\_\_\_\_

(1) Unlike MOSFET fabrication where we removed PR of METL layer to prepare for sintering, we leave the resist to stay on Al layer for MEMS fabrication. Why is this the case?

(2) Etch rate of  $\text{XeF}_2$  for  $\langle 100 \rangle$  single-crystal silicon varies from 2400 to 2900 Å/min. To release our cantilevers with 100 micron in their width, what is the shortest expected release time? We assume that  $\text{XeF}_2$  etch is perfectly isotropic, and is also perfect in selectivity between silicon and silicon dioxide.

(3) If your wafer is not dehydrated enough before you bring it into the  $\text{XeF}_2$  chamber, what kind of undesired byproduct is possibly created? (Hint: Recall the etch chemistry of  $\text{XeF}_2$ , especially when it reacts with moisture, i.e.,  $\text{H}_2\text{O}$ .)

(4) What would happen if native oxide film was left on the wafers as it went into the  $\text{XeF}_2$  etching step?

(5) Once the bimorph is released, is the cantilever bent towards upward or downward? (Thermal expansion coefficients of Al and oxide are  $6.5$  and  $0.55 \cdot 10^{-6}/\text{C}$ , respectively.)

(6) To measure voltage and current characteristics of the oxide-metal bimorph as it undergoes deflection, which equipment(s) do you need to have?