

**CHE323/384 Chemical Processes for Micro- and Nanofabrication**  
**Chris Mack, University of Texas at Austin**

Homework #3

1. Given the parameters in Table 4.1 and the activation energies in Figures 4.2 and 4.3 of the Campbell textbook (also found in the Lecture 12 notes), determine the Arrhenius coefficients for B and B/A for both wet (640 torr) and dry oxidation.
2. Does the oxide thickness at which there is a transition from linear to parabolic rates change if we perform an oxidation at a pressure of 20 atmospheres rather than at 1 atmosphere?
3. A certain technology requires a gate oxide of 95 nm, and this oxidation will be carried out in dry O<sub>2</sub> at 1000 C. There is no initial oxide on the (111) wafer. What oxidation time is required? Does this oxidation process end in the linear regime, the parabolic regime, or in between?
4. Repeat problem 3 for wet oxidation.
5. Repeat problem 3 for the case where the wafer already contains a 45-nm thick oxide film.