CHE323/384 Chemical Processes for Micro- and Nanofabrication
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Homework #5

1. Arsenic is implanted into Si (with a 7˚ tilt) at an energy of 125keV. The dose is $2\times10^{14}/cm^2$. What is the peak dopant concentration produced?

2. We are designing an implant step which will implant phosphorus ions through 50 nm of SiO_2 into an underlying silicon substrate such that the peak concentration in the substrate is $1\times10^{17}cm^{-3}$ and the concentration at the SiO_2/Si interface is $1\times10^{16}cm^{-3}$. What energy and dose would you use to achieve these conditions? Assume that the stopping power of SiO_2 is the same as that of silicon. Neglect channeling effects.

3. We wish to determine the thickness of a mask needed to reduce the peak concentration of that implant in the mask by a factor of 10,000 at the mask/substrate boundary. Provide an equation in terms of the projected range and the straggle of the implant profile in the mask material.

4. Campbell textbook, Chapter 5, problem 2.