Numerical calculation potential in MOS

Assignment #5

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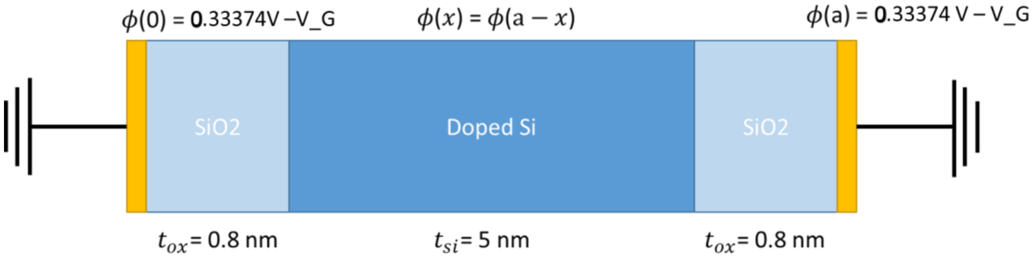

Figure 1 Schematic image for MOS structure

Numerical Results

Electrostatic potential from the depletion approximation

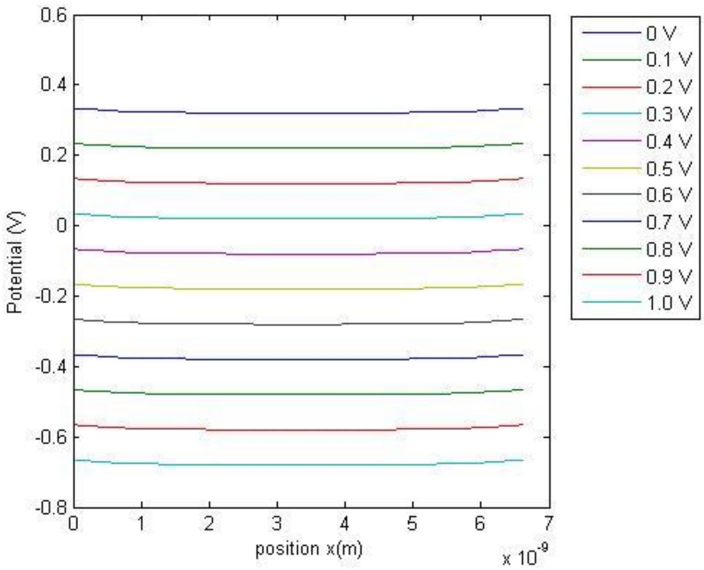

Figure 2. $\mathrm{N_{acc}} = 10^{18} cm^{-3}$, N = 67 case. Each line indicates different gate voltage.

After we get the electrostatic potential, we calculate the electron density throughout the position. Note that carrier density is changed by the electrostatic potential. $\mathrm{n}(\mathbf{r}) = n_i \exp(\phi/V_T)$

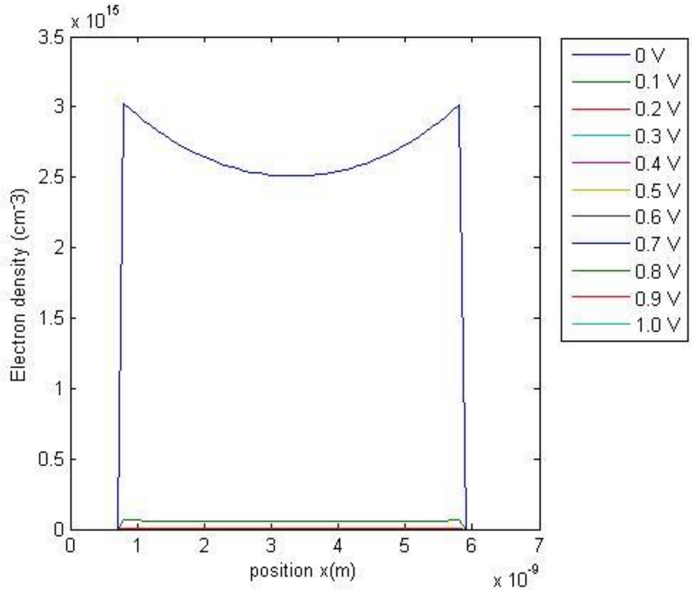

Figure 3. $\mathrm{N_{acc}} = 10^{18}cm^{-3}$, N = 67 case. Each line indicates different gate voltage.

From this electron density, the electrostatic potential is re-calculated with different gate voltage. The results are shown in figure 4.

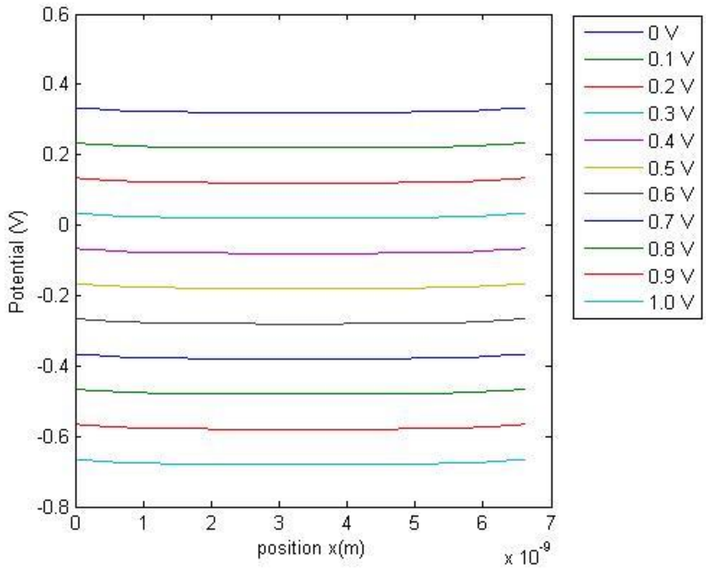

Figure 4. $\mathrm{N_{acc}} = 10^{18}cm^{-3}$, N = 67 case. Each line indicates different gate voltage

The figure 5 shows the difference between first calculation of electrostatic potential and second calculation of electrostatic potential.

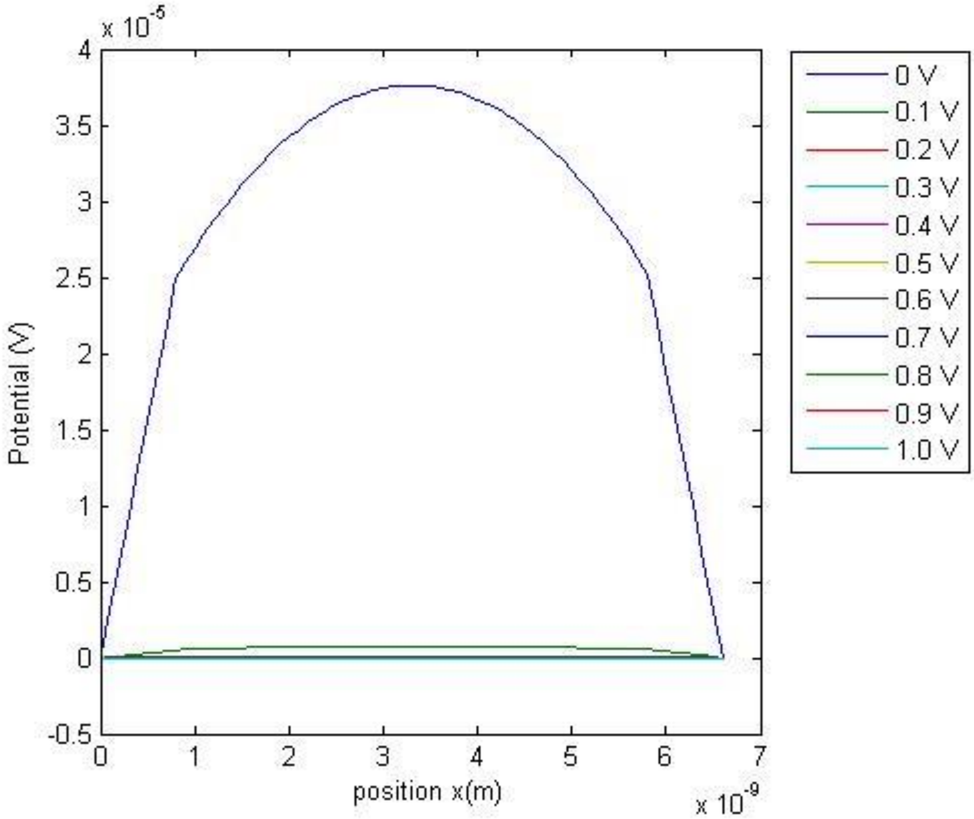

Figure 5. $\mathrm{N_{acc}} = 10^{18} cm^{-3}$, N = 67 case.