Consider a thin and wide silicon box, $L_x = L_y = 100$ nm and $L_z = 5$ nm. It is treated as if quantum confinement along the z direction only. In this case, the box considered a 5-nm-thick potential well. An electron density in the box is calculated using Fermi-Dirac distribution at different Fermi energy. As the Fermi energy increase, the electron density increase, as shown in figure 1(a). The integrated electron density is also increase, as shown in figure 1(b).
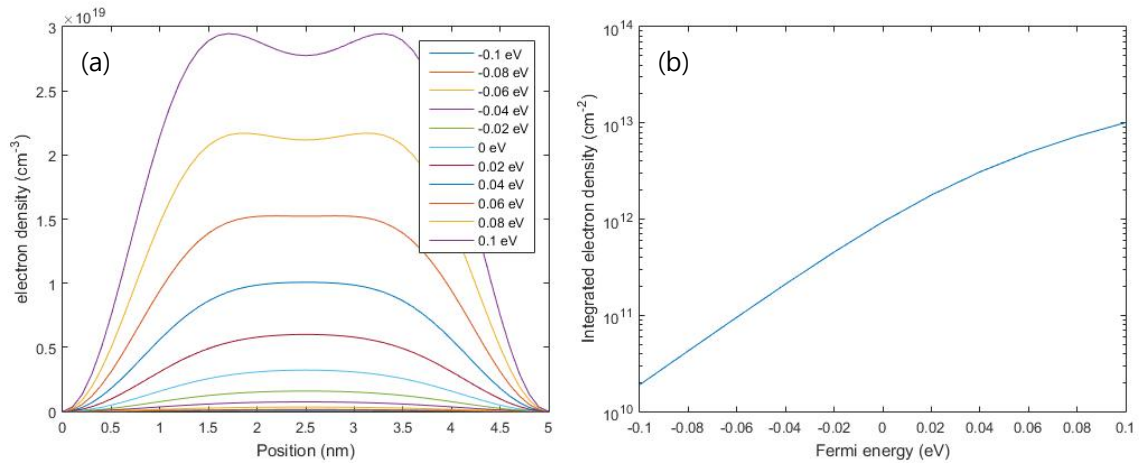

Figure 1. 5-nm-thick potential well. (a) Electron density as a function of position at different Fermi level. (b) Integrated electron density of figure 1(a).