

Homework #12

Computational Microelectronics

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1 Results

We have solved the coupled equations: the continuity equation and the Poisson equation. We consider two structure, long structure with 600 nm and short structure with 120. We apply the different spacing values for each structure; for the long structure, the spacing values are 10 nm, 1 nm, and 0.5 nm; for the short structure, the values are 5 nm, 1 nm, and 0.2 nm.

We find that the solver with the coupled equations shows very robust results for every spacing value while the Poisson solver shows poor performance at large spacing values. For the short structure, 1 nm spacing shows unstable result. This means that short structure is more sensitive to the spacing value.

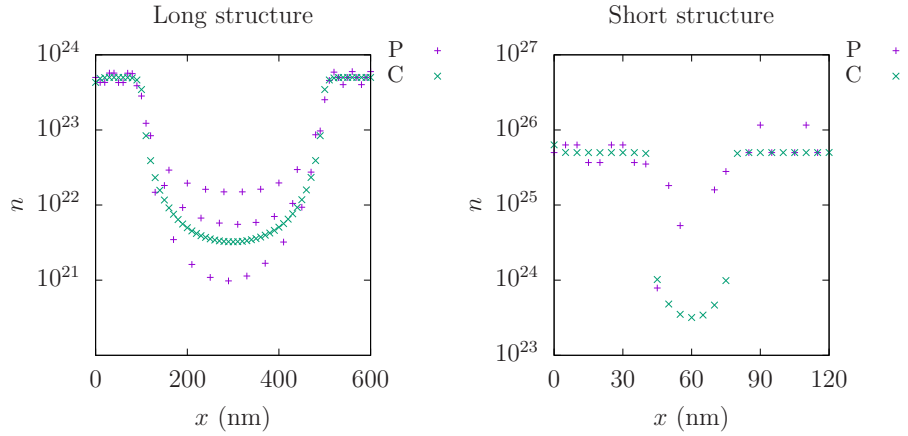


Figure 1: The electron density for (a) long structure with spacing 10 nm, and (b) short structure with spacing 5 nm. In the legend, capital 'P' means the Poisson solver, and 'C' means the coupled equation solver.

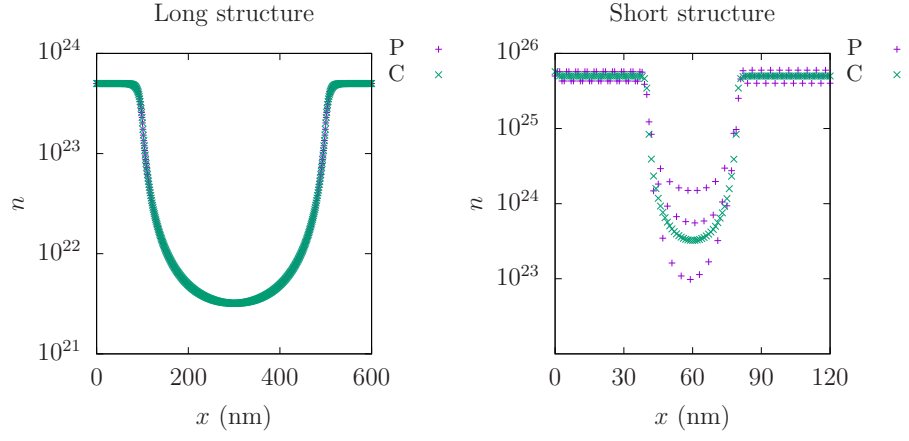


Figure 2: The electron density for (a) long structure with spacing 1 nm, and (b) short structure with spacing 1 nm.

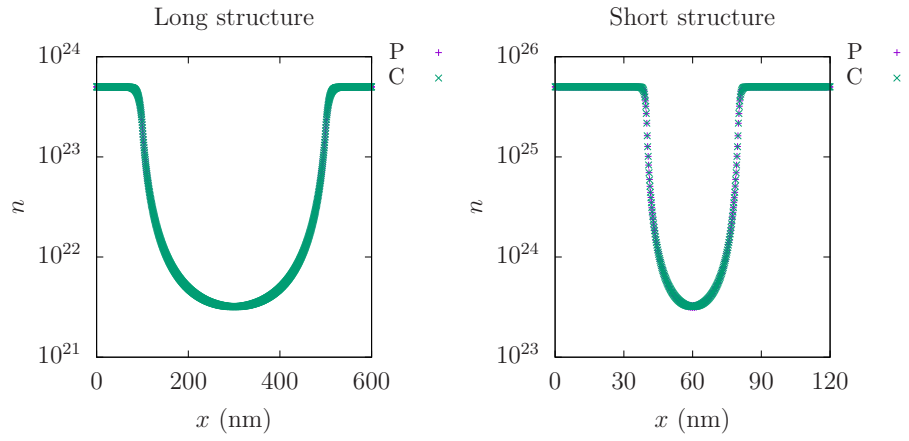


Figure 3: The electron density for (a) long structure with spacing 0.5 nm, and (b) short structure with spacing 0.2 nm.