

Current trend in simulation: A study simulation of Poly-Silicon nanowire using COMSOL multiphysics

Abstract

Poly-Silicon nanowire (Poly-Si-NW) simulations are very important field of nanotechnology and nanostructures; in this paper presented review in general nanowire and its applications such as thermoelectric device (TED) has potential applications in areas such as chip level cooling/energy harvesting and many more applications in this field. COMSOL multiphysics is one of the programmers used for nanotechnology and nanowires simulation, hence in this review paper, COMSOL simulation with different types of materials used for nanowire and other structures. Also in this work, we explore the effect of the electrical contact resistance on the performance of a TED. COMSOL simulations are performed on Poly-SiNW to investigate such effects on its cooling performance. Intrinsically, Poly-SiNW individually without the unwanted parasitic effect has excellent cooling power density. However, the cooling effect is undermined with the contribution of the electrical contact resistance.

Keywords

COMSOL Multiphysics; Nanostructure; Poly-Si nanowire; Thermoelectric device