ATOMISTIC SIMULATION STUDY OF INDENTATION OF NICKEL NANOWIRES

Trevor Avant

Abstract

Metallic nanowires are of great importance in the field of nanotechnology. A fundamental material property of nanowires is hardness. Molecular dynamics will be used to model the wires and simulate nanoindentation tests. Based on the results of theses simulations, hardness will be calculated. 30nm-diameter nickel nanowires, with varying crystal directions, will be modeled. Qualitative analysis will be performed using numerical simulation software. Quantitative analysis will be performed using equations derived from classical mechanics. The variation in hardness due to the effect of crystal orientation will be analyzed.