

Metallic nanowires: Mechanical properties – Theory and experiment

A.G.N.Sofiah^a; M.Samykano^{ab}; K.Kadirgama^a; R.V.Mohan^bN.A.C.Lah^a

^a Faculty of Mechanical Engineering Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

^b Department of Nanoengineering, Joint School of Nanoscience and Nanoengineering, North Carolina A&T State University, Greensboro, NC, USA

ABSTRACT

Recently, with the fast advancement of nanoscience and nanotechnology, metallic nanowires (MNW) have received additional attention among researchers. Metallic nanowires have many unique behaviors that are not seen in bulk materials which material properties and functionalities of the bulk tend to differ when its dimensions are reduced down to nano-sized. The development of novel devices such as molecular electronics, supercapacitors, touch sensors, and transparent electronics is due to their versatile properties such as high electrical and thermal conductivity, optical transparency and chemical inertness. Metallic nanowires are also attractive because they can be readily fabricated with various techniques. This paper will provide an overview and summarize current research and advances regarding metallic nanowire technologies, their applications, the process involved in the synthesis of the metallic nanowire, and the techniques used to study and characterize metallic nanowires. Further discussions are presented on the modeling of the metallic nanowire to understand and extract their mechanical behavior.

KEYWORDS:

Nanowire; 1D nanomaterial; INanoscale modeling; Synthesis; Nanowire characterization