

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Electro-orientation as a facile way to characterize the electrical properties of nanowires¹ CEVAT AKIN, JINGANG YI, JERRY SHAN, Rutgers University, QI CHEN, WEIHE XU, YONG SHI, Stevens Institute of Technology — The electrical conductivity and/or permittivity of nanowires are often poorly known, heterogeneous, and difficult to measure by traditional direct-characterization methods such as 4-point-probes. Electro-orientation, the rotation of nanowires in liquid suspension into alignment with an external electric field, offers a potential alternative measurement technique that is simple and also compatible with further solution-based sorting and processing of nanowires. We present experimental results obtained by optical microscopy on the alignment rate of nanowires under spatially uniform AC electric fields of different frequency. Silicon nanowires of known conductivity were fabricated using metal-assisted chemical etching and tested to determine how the cross-over frequency for electro-orientation varies with particle conductivity and aspect ratio. We compare our experimental results with theoretically obtained values, and assess the potential of electro-orientation as a quantitative method of characterizing the electrical properties of large-aspect-ratio particles in liquid suspension.

¹Supported by NSF CBET 0644719

Jerry Shan
Rutgers University

Date submitted: 03 Aug 2012

Electronic form version 1.4