

Charge Transport through Molecular Wires and Inorganic Nanowires

Takhee Lee*

Department of Materials Science and Engineering, Gwangju Institute of Science and
Technology, Gwangju 500-712, Korea

* E-mail : tlee@gist.ac.kr

The charge transport of molecular wires is studied using various characterization platforms: nanoscale device, micro-via hole structure device, and a structure for conducting atomic force microscopy (CAFM), in which lateral areas span from the nanometer to the micrometer scale.

Micro-via hole structure devices were fabricated to study conduction mechanism of alkanethiol molecules and particularly the device yield study. The devices were characterized by length-dependent and temperature-dependent current-voltage measurement. The device yield of micro-via hole structure devices was found as ~ 1 % out of more than 13,000 fabricated devices. Particularly, criteria of statistical determination of working molecular devices will be proposed.

Using the structure for CAFM, we estimate a degree of molecular tilt of alkanethiols by a mechanical contact theory, and then study the effect of tilt angle on current-voltage characteristics, e.g., chain-to-chain coupling under the influence of tip contact to SAM.

Some recent works on nanowires devices will be briefly discussed.