NANOHOUR

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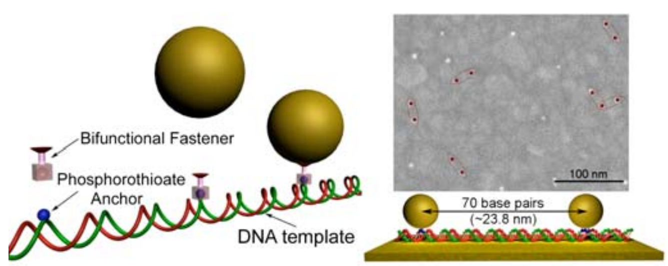
3:00 PM
Beckman Institute - Room 3269

Single-walled Carbon Nanotube Thin Film Type Electronics - Demo of a Medium-Scale Integrated Digital Circuit
Qing Cao – Graduate Student, Chemistry Department

Singled-walled carbon nanotubes (SWNTs), in the form of ultrathin films of random networks, aligned arrays, or anything in between, provide an unusual type of electronic material that can be integrated into circuits in a conventional, scalable fashion. The electrical, mechanical, and optical properties of such films can, in certain cases, approach the remarkable characteristics of the individual SWNTs, thereby making them attractive for applications in electronics, sensors and other systems. Here we discuss the synthesis and properties of SWNT thin films with emphasis on examples of their use in digital electronic circuits with levels of integration approaching 100 transistors and novel optically transparent electronics. The results represent important steps in the development of an SWNT based electronics technology that could find utility in areas such as flexible electronics, optoelectronics and others that might complement the capabilities of established systems.

Precise Control of Distances between Gold Nanoparticles Using Phosphorothioate Anchors on DNA and Bifunctional Linkers
Jung Heon Lee – Graduate Student, Chemistry Department

Precise control of the position of and distance between nanomaterials is at the heart of nanoscale science and technology. DNA has been shown to be highly programmable molecules resulting in a number of 2D and 3D nanostructures. Despite the huge promise, functionalizing these DNA-based nanostructures with nanomaterials has been a challenge in the field. Here we introduce a simple but precisely controllable method to assemble gold nanoparticles (AuNPs) on DNA by using a simple modification on DNA as an anchor and a bifunctional linker that can connect a AuNP to DNA as a fastener. The chemical attachment between a AuNP and a bifunctional fastener treated modified DNA has been demonstrated in solution by plasmon peak shift as AuNPs aggregate and disassemble due to the DNA hybridization and denaturation. Distance between AuNPs assembled on DNA could be controlled by simply changing the position of the modification on DNA with identical sequences and it could be observed on surface by Scanning Electron Microscopy (SEM) images and statistic analyses. The methodology demonstrated can be applied to using DNA for precise distance and topological control of nanomaterials in one, two, and three dimensions.



Coffee and cookies will be served.
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