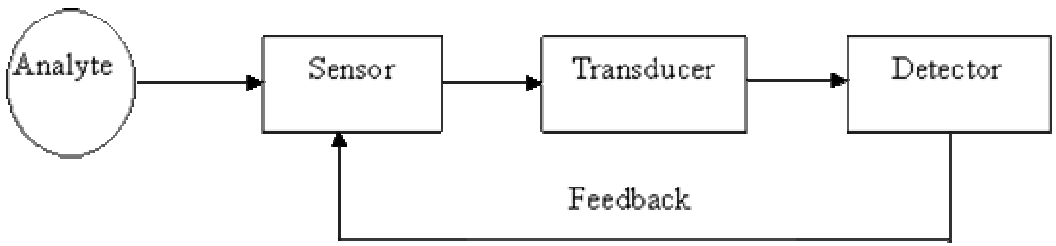
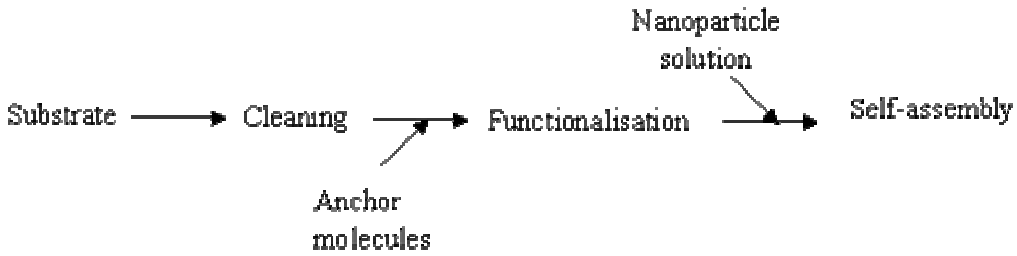
Chapter - 12

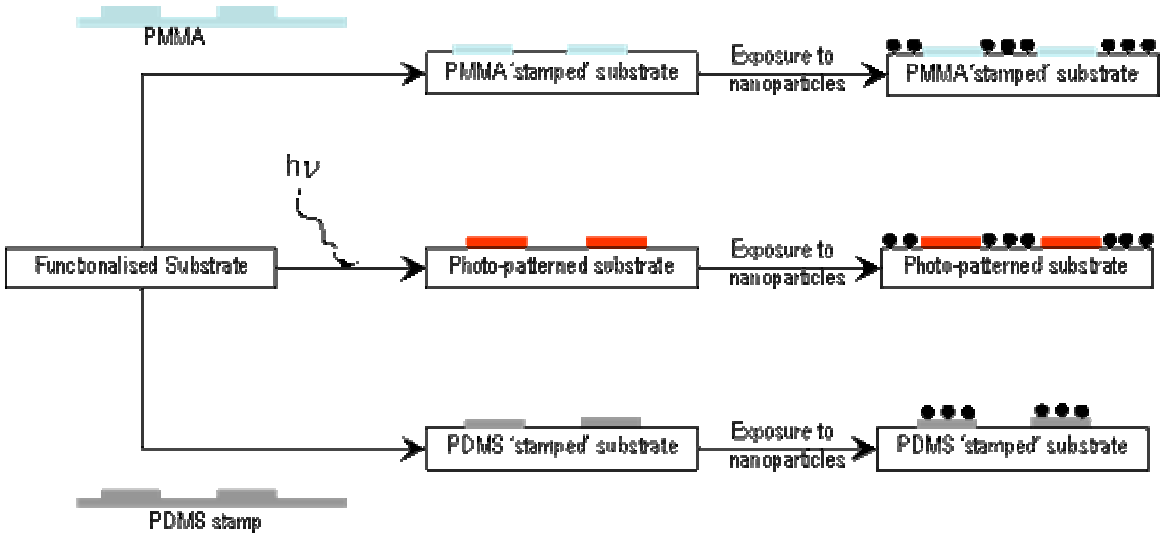
NANOSENSORS



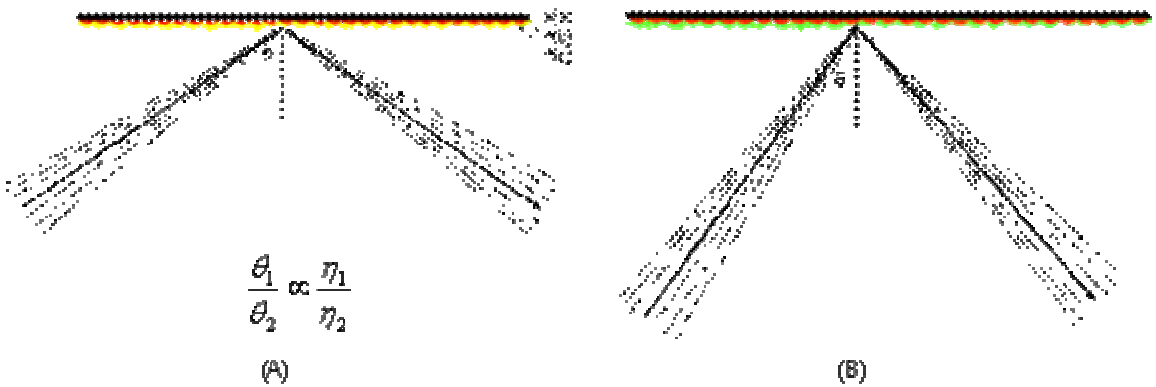
Scheme 1. Schematic of the design of sensor



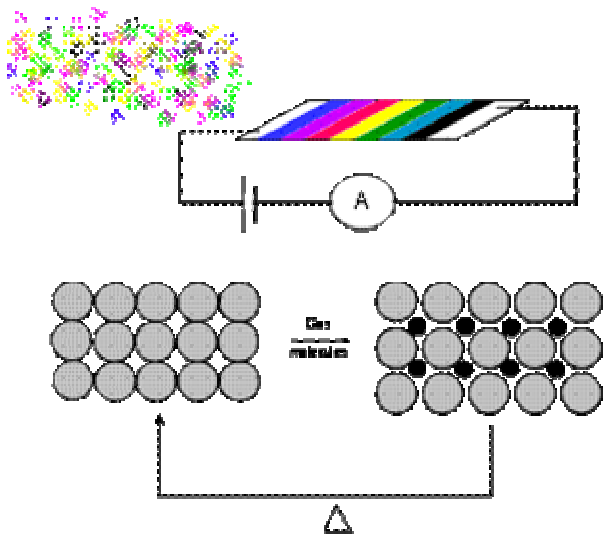
Scheme 2. Schematic representation of self-assembly.



Scheme 3. Some of the methods of template assisted organization of nanoparticles.



Scheme 4. Schematic of SPRS. (a) Opaque substrate (b) nanoparticle (c) parent plasmon electric field in (A) and the modified field in (B).



Scheme 5. Working of an electronic nose. The diffused colors represent different gases and the solid colors represent the various nanoparticles that are sensitive to the specific gas molecules. The gases thus adsorbed on the films, might be removed by suitably heating the array, making it possible for repeated use of the system.

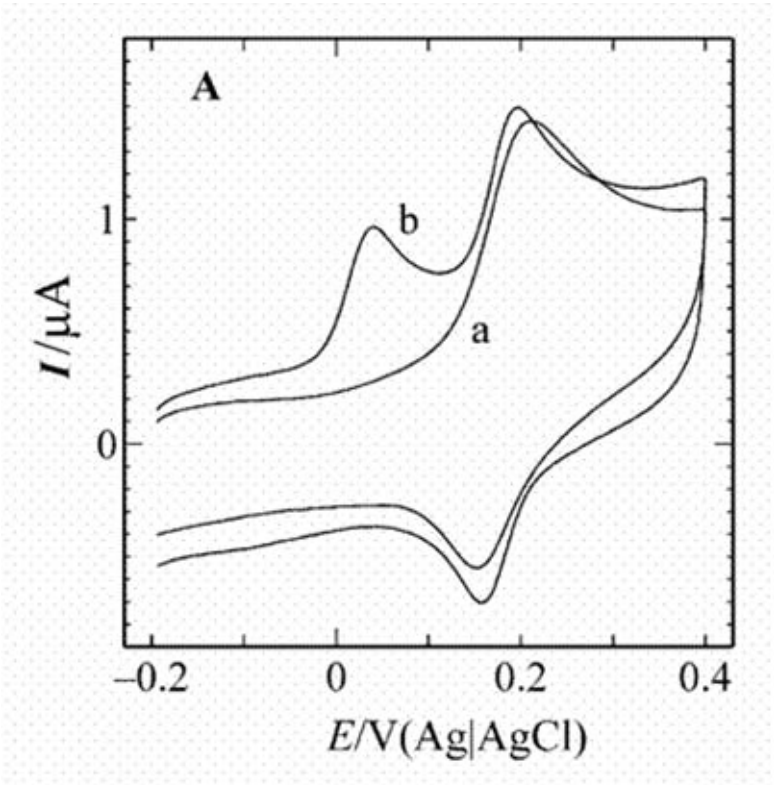


Figure 1. Cyclic voltammograms of a binary mixture containing equimolar concentrations (50 mM each) of AA and DA at the bare Au (a) and nano-Au (b) electrodes in 0.1 M PBS (pH 7.2). Scan rate: 100 mV s^{-1}. (C. Retna Raj, Takeyoshi Okajima, Takeo Ohsaka, *Journal of Electroanalytical Chemistry*, **2003**, *543*, 127-133.)

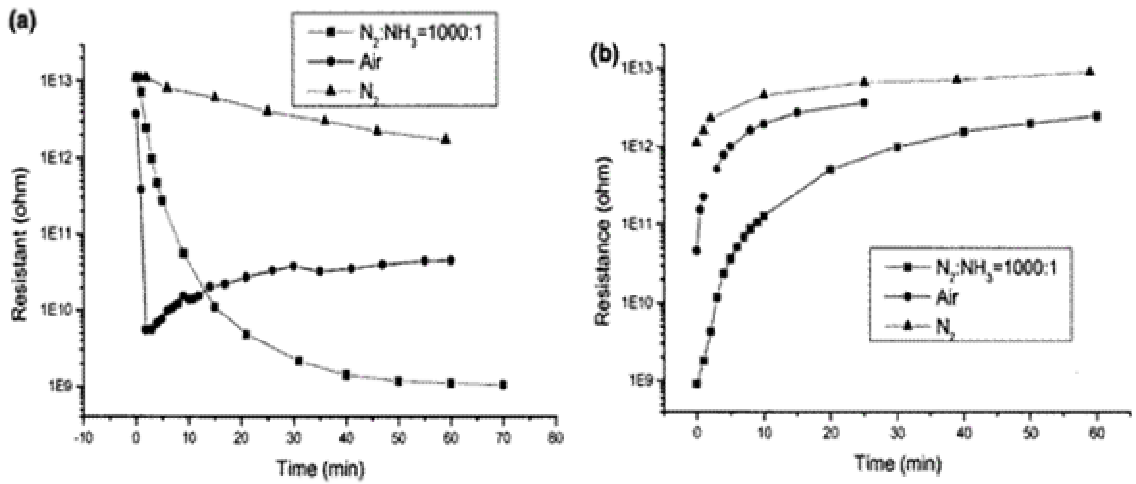
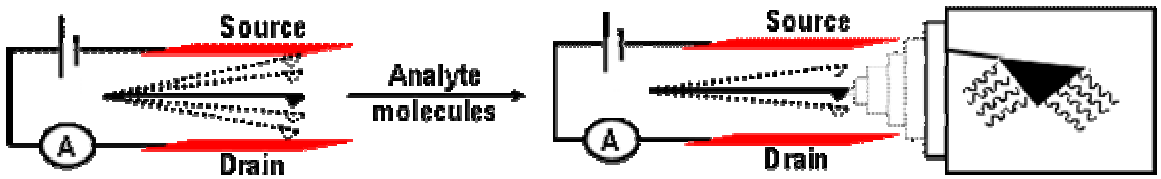
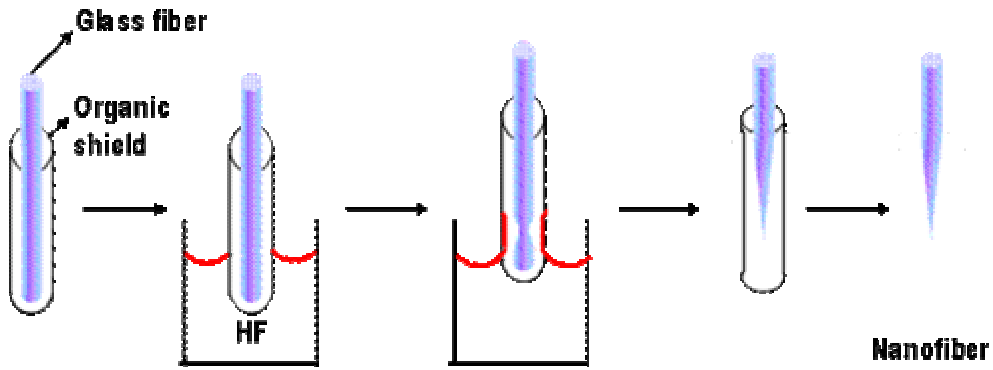


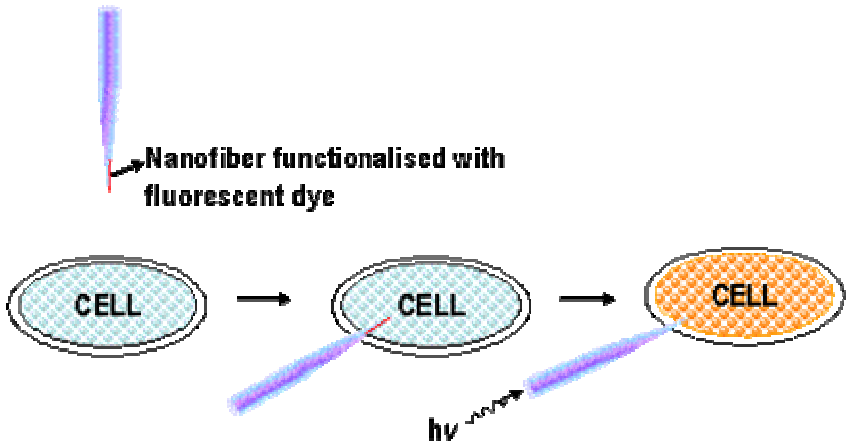
Figure 2. Electrical responses of the Si nanowire bundle to N_2, a mixture of N_2, NH_3 (NH_3 concentration: 1000 ppm), and air with a relative humidity of 60%; (a) when the gases were introduced into the chamber and (b) when the gases were pumped away. (X.T. Zhou, J.Q. Hu, C.P. Li, D.D.D. Ma, C.S. Lee, S.T. Lee, *Chemical Physics Letters*, **2003**, *369*, 220-224.)



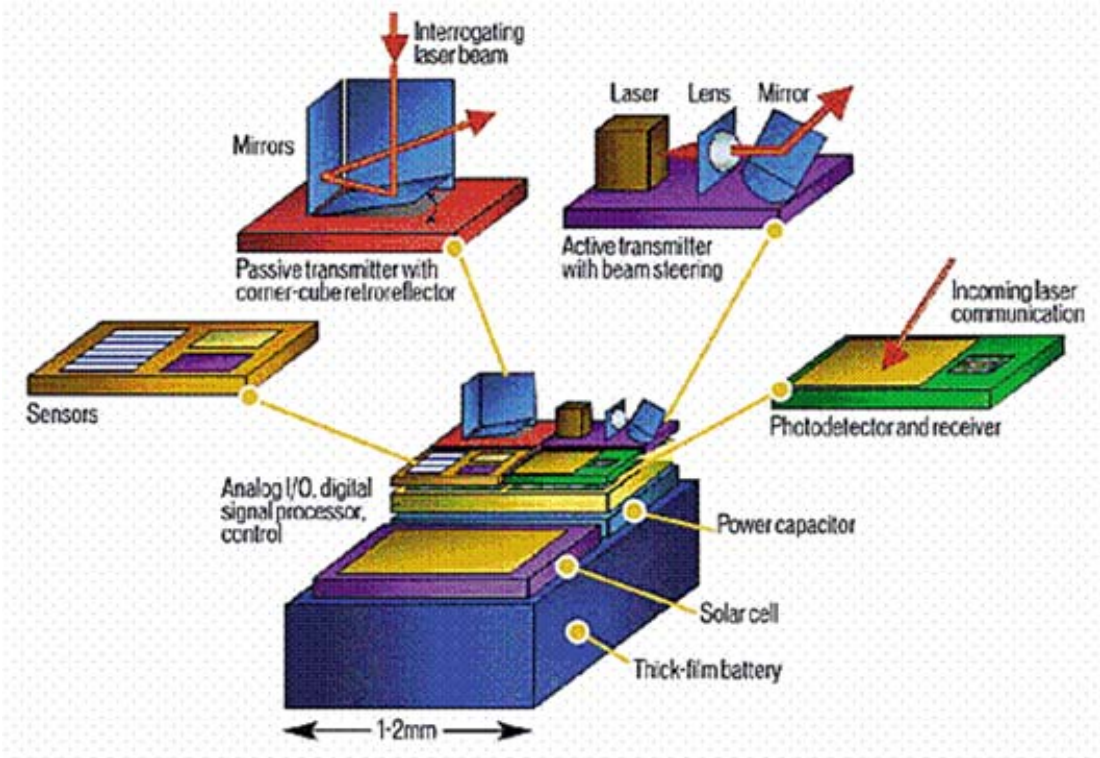
Scheme 6. Graphical representation of the working of a nanocantilever sensor. The damping of oscillations after exposure to analyte molecules is observed. The cantilever tip is enlarged to show the presence of the analyte (indicated by curved lines).



Scheme 7. Cartoon representation of fabrication protocol of a nanofiber as a probe for biological sensing and imaging. As the optical fiber is withdrawn from the HF solution, surface tension causes HF to initially rise along the organic cladding. Slow draining of HF from there causes a nanotip to be formed, after which the organic cladding is removed by treating with a suitable solvent.



Scheme 8. Diagrammatic representation of *in-situ* detection and imaging of cellular components.



Scheme 9. Proposed structure of a smart dust multifunctional sensor. From the Webpage, http://www-bsac.eecs.berkeley.edu/archive/users/warneke-brett/SmartDust/index.html. Used with permission.