



## SECOND INTERNATIONAL NANOTECHNOLOGY CONFERENCE ON COMMUNICATIONS AND COOPERATION

### Abstract

**Bio Nano Process: Making nanoelectronic devices by biological path**  
by Ichiro Yamashita, *ATRL Panasonic & NAIST*

Biology and semiconductor technologies have progressed independently. There was a large distance between them and a substantial interdisciplinary research area was left untouched. Recently, this situation is undergoing a change. Some researchers are stimulating semiconductor technology to introduce bio-molecules into the nano-fabrication process. We proposed a new process for fabricating functional nano-structure on a solid surface using protein supramolecules, which is named "Bio Nano Process" (BNP). As a first try, we employed a cage-shaped protein, apoferritin and synthesized several kinds of nanoparticles (NP) in the apoferritin cavity. A monolayer of them was made on the silicon wafer and this array was heat treated or UV/ozone treated. These processes produced a two-dimensional inorganic NP array on the silicon surface and floating nanodots memory using this NP array was fabricated successfully. We also proposed another process using the obtained nanodot array as the nanometric etching mask. This was realized by the neutral beam etching and 7nm Si nano columns with high aspect ratio were fabricated. These experimental results demonstrated that the BNP can fabricate the inorganic nanostructure for a variety of applications and the BNP opened up a biological path to nanoelectronic devices.