Symp C5

# Mimicking Natural Systems for Potential Applications: Formations of Nanotransistors and Photonic Crystals
# 자연을 모방한 방법을 통한 나노트랜지스터와 광자결정 제조

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As the demand for miniaturization of electronic devices is largely consumer-driven, factors such as low cost and massive market applications are important. To be effectively applied in microelectronic devices, novel materials must be easily fabricated into micro- to nanoscale patterns. However, the construction of novel materials based microelectronic devices has been impeded by the technical challenges. Consequently, researchers in many disciplines are looking for simple and inexpensive ways for the production of nanoscopic-sized sophisticated structures that play a central role in microelectronics. Up to present, the top-down approach, which includes lithography and pattern transfer, has been used in general. However, as the top-down method has reached cost and technical limits at the level of about 100 nm, bottom-up, cost-effective strategies are employed as an alternative way since they allow nature to do the assembly work and the control of molecules with a length scale down to about 10 nm. Here, as an obvious extension of the bottom-up method, we show a new way for the production of 3-dimensional structures at the nanometer scale. Our method mimics natural systems in which different interfacial phenomena catalytically or epitaxially induce the regioselective nucleation and growth of specifically oriented inorganic and organic structures. Since our approach is quite simple and works for a large number of metals and polymers, sophisticated nanosized electronic devices such as nanosized transistors and tunable photonic crystals can be simply formed from their respective precursors.