

Fabrication of Nano-reactor Array for Enhanced Enzyme Stability

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Nano-reactor arrays were fabricated by 'top-down' lithographic process for the enzyme immobilization with enhanced stability. Each nano-reactor was considered to contain a single or a few enzyme molecules which were believed to be stabilized by their local 'humid' environment. Diameter and depth of the reactors were both in the range of 30-50 nm. The inner wall of the nano-reactor was selectively functionalized by a series of reactions involving aminoalkylsilane, succinic anhydride, NTA (Nitriloacetic acid), and Ni²⁺. His-tagged protein tyrosine phosphatase (PTP) was then immobilized in the nano-reactor by Ni-NTA. The catalytic activity of the PTP in the nano-reactor was measured at an interval, which was compared to that on a flat surface and the effect of the nano-structure on the enzyme stability was discussed.