

Carbon nanotubes based nanoelectrode arrays: fabrication, evaluation, and sensing applications

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Fabrication, electrochemical characterization, and applications of carbon nanotubes based nanoelectrode arrays (CNTs-NEAs) will be presented. Nanoelectrode arrays (NEAs) were fabricated from the low site density aligned carbon nanotubes (CNTs) (Fig 1). The CNTs were grown by plasma enhanced chemical vapor deposition (PECVD) on Ni nanoparticles made by the electrochemical deposition. Each nanotube is separated from the nearest neighbor by several microns. The NEAs consisting of up to millions of individual nanoelectrode with diameter of 50-80 nm were made in 1 cm² area by this non-lithography method. Electrochemical characterization including cyclic voltammetry and square wave voltammetry were performed. The CNTs-NEAs provide an excellent platform for ultra sensitive electrochemical sensors for chemical and biological sensing. Applications of CNTs-NEAs for detection of glucose and toxic metal ions will be discussed.

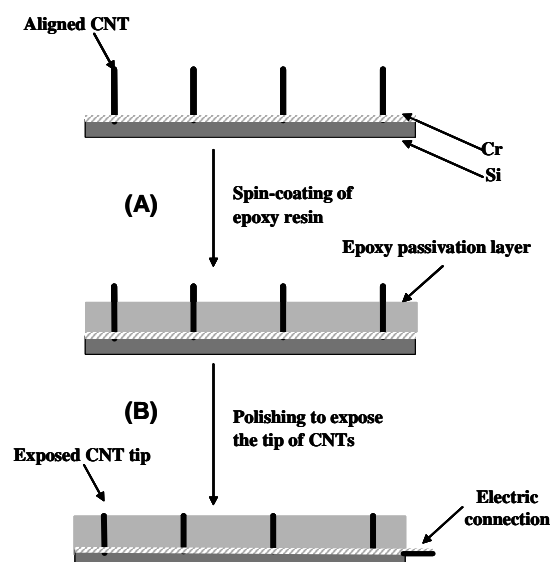


Fig. 1. Fabrication scheme of the CNT nanoelectrode arrays. (A). Spin-coating of epoxy resin as passivation layer; (B) Polishing to expose the tip of CNTs