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Fabrication and characterization of individual nanotube based nanoelectrodes for chemical and biological sensing KYUNGSUK YUM, HANNA CHO, JIE HU, MIN-FENG YU, University of Illinois at Urbana-Champaign — We present the fabrication and characterization of individual nanotube based high aspect ratio nanoelectrodes for chemical and biological sensing. The nanoelectrodes are fabricated by coating nanotubes with metal and, subsequently, with thin insulating layers, and cutting the end of the nanotubes. This process yields ring-shaped nanoelectrodes with total structural diameter of ~ 100 nm, including insulating layers, and length up to ~ 30 μm. The nanoelectrodes are characterized by cyclic voltammetry (CV), and the structure of the nanoelectrodes is examined in transmission electron microscope (TEM). The nanoelectrodes show steady-state voltammetric current responses and good insulation of the side wall of nanoelectrodes. These high aspect ratio nanoelectrodes will open up a new opportunity for electrochemical sensing in microscale environments, e.g. probing local intracellular environments without damaging cells, with high temporal and spatial resolution.

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