

Tuning the Characteristics of Electrochemically Fabricated Gold Nanowires

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We have developed different electrochemical procedures for the production of gold nanowires with variable and controllable crystallographic and morphological properties using etched ion track templates. The texture of the nanowires is tuned by the variation of the electrodeposition parameters. Potentiostatic plating at low overvoltage provides strongly $\langle 110 \rangle$ textured wires for diameters below 100 nm. With the increase in diameter above 100 nm, this texture decreases and the signal from $\{111\}$ planes becomes more pronounced. Under reverse pulse deposition conditions, $\langle 110 \rangle$ textured wires are generated. The growth mechanism is discussed in detail in terms of the surface energy minimum principle. In addition, wires are shaped in a reliable way from cylindrical to conical geometry by engineering the pore structure in the template.