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High Aspect Single Crystalline Au Nanowire Electrode with an Atomically Smooth (111) Surface

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Ultrasmall electrodes are of great importance for basic electrochemical study and applications. We fabricated single crystal (111) Au nanowire (NW) by growth mechanism on substrate without any catalyst. Consequently, these high aspect NW combined with tungsten microwire and the electrodes having NW tip on their end were obtained. These single crystal Au (111) NWs were characterized by electron microscope and electrochemical analysis. We show that precise electrochemical measurement could be possible on these NW electrode by obtaining underpotential deposition (UPD) and ferricyanide CV profiles on the electrode. The immersed depth of electrode into solution was controlled in micrometer scale by piezo-driven manipulator.

Keywords: nanowire, electrode, single crystal, gold, Au