Brief Fine Polishing of Thin-film Gold Electrode Sensors Leads to Better Reproducibility than Electrochemical Pretreatment

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Surface roughness of the electrode and its activation is critical for improved reproducibility of biosensors. Electrochemical cycling has traditionally been the preferred approach for electrochemical activation with only a few reports of mechanical polishing as the surface activation technique. This study compares the efficiency of mechanical polishing and electrochemical activation of thin film gold electrode surfaces for electrochemical measurements. The effects of the approach on both the electrochemical activity and surface variations were studied. Our findings suggest that brief polishing with 50 nm alumina nanoparticles resulted in improved electrochemical activity and better electrochemical area and roughness control when compared to the electrochemically activated counterparts.

Keywords: Thin-film electrodes, bio-sensors, surface roughness, electrochemical sensors, gold electrodes

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