



Figure 1: (a) Stable CV responses of Pt{110} in 0.1 M perchloric acid cooled in different gaseous environments after flame annealing. (b) Subsequent potential cycle from 0 to 1.2 V demonstrating variations in electrochemical oxide formation depending on surface preparation. Sweep rate = 50 mV/s.

Figure 2: Stable CV responses of Pt{110} in 0.1 M perchloric acid cooled in different gaseous environments after flame annealing. Black curve corresponds to stable CV collected prior to excursion to oxide electrosorption potential region, red curve shows subsequent oxide electrosorption potential sweep. (a) Cooled in CO. (b) After first excursion into oxide region in (a). (c) Cooled in air. (d) Air-cooled electrode treated with 10 potential cycles in a solution saturated with CO. Sweep rate = 50 mV/s.



Figure 3. Third peak on Pt(110) cooled in air, hydrogen and CO. 2 minutes @ 0.02 V. 0.1 M H2SO4. Scan rate 50 mVs-1.



Figure 4: CO-charge displacement data for air-, hydrogen- and CO-cooled Pt{110} electrodes including values of PZTC indicated by the arrow.



Figure 5: Nitrate reduction CVs on stepped Pt{110} electrodes in aqueous 0.1 M perchloric acid + 0.01M M KNO3 for CO-cooled (right column), hydrogen-cooled (central column) and air-cooled (left column) electrodes. Bottom figures = Pt(S)-[nPt{110}x{111}] data, Top figures = Pt(S)-[nPt{110}x{100}] data. Sweep rate = 10 mV/s.



Figure 6: Plot of nitrate reduction current density versus step density for Pt(S)-[n{110}x{111}] electrodes, flame-annealed and cooled in air, hydrogen and carbon monoxide.



Figure 7: Plot of nitrate reduction current density versus step density for Pt(S)-[n{110}x{100}] electrodes, flame-annealed and cooled in air, hydrogen and carbon monoxide. The heavy dashed line in green indicates the theoretical behaviour if there was a one-to-one correspondence (no faceting) between “{100}” step density and nitrate reduction current density.