

Cation Effect on Mass Changes of a Gold Electrode in
Basic Media

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Electrochemical Quartz Crystal Microbalance (EQCM) with AT-cut 10 MHz crystal was used to record current voltage (CV) and mass-voltage curves in 0.5M KOH, NaOH and LiOH solutions. The potential limits were from -1.4V to 0.65V with the scan rate equal 50 mV/s. CV-curves in all electrolytes under study look similar. They show well recognized Au-oxidation region starting at about 0.1V vs. SCE and a surface Au-oxide reduction peak with a maximum at about 0.05V vs. SCE. In contrast, observed mass changes are different depending on the electrolyte. Mass change corresponding to the surface Au-oxide reduction is 119ng in KOH, 70ng in NaOH and only 40ng in LiOH. Mass changes in the non-Faradaic region differ as well. In the negative scan from -0.35 V to -1.40V mass changes by 233ng in KOH. The analogous change in NaOH and in LiOH is much smaller, 68ng and 73ng respectively. These preliminary results suggest that cation adsorption on the working electrode surface plays a role in the Au-oxidation and reduction.