Grant Messner

Section 2

Ch 3x Weekly Assignment 6

Experimental Section:

A 1cm cm glass control slide was clamped to a conducting copper sheet with a binder clip, and placed in a ~5 cm long plastic cuvette filled with 0.1 M solution (filled directly from stock solution), along with a platinum counter electrode and reference electrode. A 365 nm LED was connected to a driver box with the light intensity at maximum, and the corresponding Aftermath computer program used to collect data. The current was plotted as a function of voltage for the control slide with the LED both off and on, with the voltage range set from .5V – 3V and sweep rate to 50 mV/s on the Avantes software, and no observable difference was noticed in the two plots. Then, this process was repeated for a 1cm cm glass slide with slurry, and current was again plotted as a function of voltage with the LED off, this time with a voltage range of 0V – 1V and a sweep rate of 50 mV/s. Then, the LED was turned on and current was plotted as a function of time for 10 minutes, with an induction time of .5 seconds, an irradiation potential of .75 V, and sample count of 6000. The LED was manipulated in various ways over the 10 minute interval as detailed in the lab notebook. The slide was then dipped 10 times in 0.1 M solution and 0.1 M solution (alternating), and the process was repeated for a 5 minute interval with a sample count of 3000 and the other settings the same.

Electrolysis of water for graphs:

*Figure 1: Control sample (glass slide with no ) Current vs. Potential graph for the electrolysis of water, with no applied LED light. Notice how the graph roughly obeys Ohm’s Law for potentials greater than the oxidation potential of water (0.98 V in this solution).*

*Figure 2: Control sample (glass slide with no ) Current vs. Potential graph for the electrolysis of water, with a 365 nm applied LED light. Note that this graph is almost identical with figure 1 above, indicating that the presence of the LED light has no effect on the way that the control sample behaves, as expected.*

*Figure 3: slide Current vs. Potential graph for the electrolysis of water, with the LED turned off. Note that the current rises much more quickly here than it does for the control solution with increasing voltage. Also note that Ohm’s Law is not obeyed in this voltage region (0-1 V).*

Bulk Electrolysis Graphs:

*Figure 4: Bulk electrolysis graph for the standard slide. The light intensity, placement, an*

*Figure 5: Bulk electrolysis graph for the dipped slide. The LED intensity, pulsing, and positioning were again varied over time, resulting in higher currents with higher light intensity and lower currents with lower light intensity again. The word “wow” was spelled between roughly 175 – 300 seconds for extra credit.*