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Procedure lab 5

1. Clean the ~1cm x ~5 cm slides (6 slides) and ~3cm by ~4cm slides (3 pieces) with soapy water, rinse, clean with acetone, and dry.
2. Add 2.5 mL of water to .5 g of dried powder. Add 100 of Triton-X (a surfactant), 200 of acetylacetone, and sonicate for at least 30 minutes. These will be used during the next few weeks.
3. Tape the 6 1x5 conducting slides for water splitting. Tape the conducting slides to the lab bench with Scotch tape by masking off about 5 mm on opposite edges of the slide. The tape is the edge of a channel that will control the thickness of the films. Test that the conductive side is up with a voltammeter.
4. Use a Pastuer pipette to transfer a few drops from the top of the slurry to the bare portion of the slides. It is important to only use the top (called the supernatant) since this is where the most highly dispersed particles reside.
5. Take a glass rod rod and smear the drops slightly to begin to fill the channel. Then take the rod and wipe across the surface of each slide lengthwise from end to end, pressing slightly. This should result in a blue-ish white, transluscent film left on the side.
6. The solvent should be evaporated from the films before they are sintered, so let the films rest on countertop for 5-15 minutes, then transfer to warm (about 100 C) hot plate. Once hot plate appears dry, increase the temp gradually (start with like 20 C and increase to like 400 – 500 C over 45 minutes). Allow plates to sinter for 60 minutes at 400 C. Observe color changes that could occur here. The TAs will turn hot plate off and move slides to storage location.
7. Use the same procedure to prepare 3x4 slides coated with TiO2 to use in the last lab. ~1 cm of space is needed on one end of the slide without TiO2 for electrical attachments, so make sure it is taped.
8. The other side of the slide tape should be minimal distance from the edge, just enough to keep it from moving.
9. Lastly, measure surface area of each electrode and estimate uncertainty in measurements.