**سولفوریک آنودایز**

**Sulfuric Acid Anodize Titration Procedure:**  
*Principle:* One sample is titrated with caustic soda to determine the sum of acid and aluminum. Another is treated with potassium fluoride to precipitate aluminum and titrated to determine acid. The difference is calculated as aluminum.  
*Reagents:* Standard sodium hydroxide solution, 1.0 N. Potassium fluoride solution. Dissolve 50 g KF:2H2O in 100 mL of water and neutralize to phenolphthalein. Store in a plastic container. (KF will etch glass.)  
*Procedure:* Take two separate 10 mL samples, dilute each to about 150 mL with DI or distilled water and add phenolphthalein. While stirring vigorously, titrate one portion with standard caustic to the indicator end point. Record the titrant volume as “A.”  
Titrate the other portion slowly with standard caustic until the alumina that forms with the addition of each drop is only slowly re-dissolved. Now add 20 mL potassium fluoride solution (or about 5 g KF powder – a rounded plastic spoonful) and continue the titration to the phenolphthalein endpoint. Record the titrant volume as “B.”  
*Calculations:*  
Free H2SO4, g/L = B × normality of NaOH × 4.9.  
Aluminum, g/L = (A – B) × normality of NaOH × 0.9.

**Titration Method for Sulfuric Acid Anodizing Bath Using Methyl Orange as Indicator:**

1. Pipette a 5.0 mL sample of the bath into a 250 mL Erlenmeyer flask.
2. Dilute to about 50 mL with DI water.
3. Add a few drops of methyl orange indicator.
4. Titrate with “B” mL of 1.0N NaOH from orange to a yellow endpoint.

*Calculation:*   
“B” mL × 9.8 = g/L H2SO4

1. Add a few drops of phenolphthalein indicator.
2. Titrate to a total of “A” mL with 1.0 N NaOH from colorless to pink endpoint.

(Slight pink color that persists is proper endpoint.)

*Calculation:*   
“A” mL – “B” mL of NaOH × 1.8 = g/L dissolved aluminum

**pH Method:**  
A 5 mL sample of the electrolyte is pipetted into a 400 mL glass beaker and diluted to approximately 200 mL. With the pH electrode inserted and stirring the solution continuously, the diluted sample is titrated using 1.0 N sodium hydroxide solution until a pH of 3.6 is reached. Record the amount of NaOH used as “A.”

Continue titrating until a pH of 10.0 is reached. Record the total amount of sodium hydroxide used as “B.”  
*Calculation:*  
“A” × normality of sodium hydroxide × 9.8 = g/L sulfuric acid  
(“B” – “A”) × normality of sodium hydroxide × 1.35 = g/L aluminum