1 (3 pts). What is surface tension and why does this change with potential?

Surface tension is the energy required to produce a unit area of new surface. 

\[ \gamma = \frac{(\partial E)}{\partial A} \]

\( \gamma \) = change in enthalpy per energy.

As the change in potential of the PZC, the overcharge occurs to reduce the Hg electrode. Electrostatic repulsion causes the cylindrical & reduce and \( \gamma \) decreases. The electrostatic repulsion causes the surface to expand further than the normal tendency.

2 (3 pts). Design an experiment to determine the potential of zero charge (PZC) of Hg in contact with 0.1 M NaCl. Provide specifics about the experiment and show what the data would look like.

Recorder electrolysis curve of depurine or \( r \) vs. \( E_{app} \). 

\[ t_{max} = \frac{2 \pi \gamma}{m \gamma} \]

E = electrolyte radius, \( m = \) pore rate, \( \gamma = \) gravitational acceleration.

One would want the very thin as a function of \( E_{app} \). The maximum is at PZC.

3 (2 pts). Assuming no contact or specific adsorption of anions, what would a plot of the surface excess (\( zF \text{Ti} (\mu C/cm^2) \)) charge density for Na\(^+\) and F\(^-\) look like at potentials positive and negative of the potential of zero charge. Show in the form of a plot.

\[ \sigma = -E - \left( \frac{\partial \gamma}{\partial E} \right)_{\text{PZC}} \]