

HW#2

MEGN570A: Electrochemical Systems Engineering

Peter Pajka

The double layer potential is governed by $\frac{d\Delta\phi}{dt} = -\frac{i_{\text{dl}}}{C_{\text{dl}}}$, so the electrode–electrolyte interface behaves as a capacitor discharging through a charge-transfer resistance; thus, its transient evolution is analogous to the exponential decay of an RC circuit. The system starts at the initial value, quickly resolves the double layer capacitance, and then asymptotically approaches a steady-state value for the electrostatic potential.

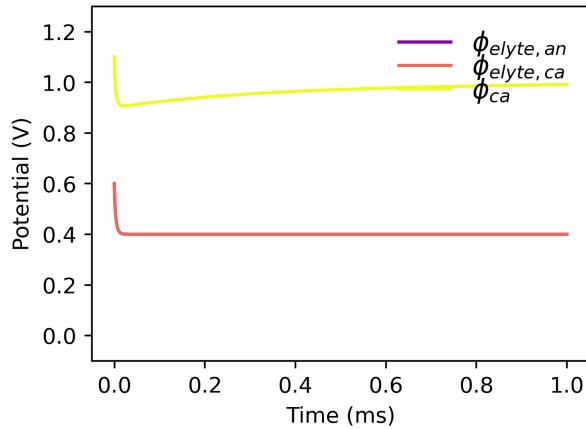


Figure 1: SOFC potentials with $i_{\text{ext}} = 0 \text{ A/m}^2$

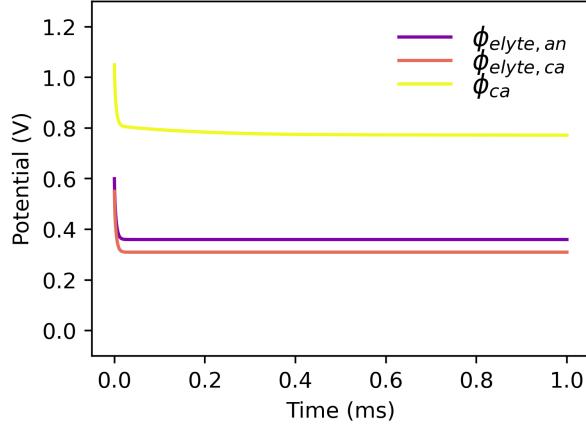


Figure 2: SOFC potentials with $i_{\text{ext}} = 500 \text{ A/m}^2$