Oxidation-Reduction Reactions

$$Fe^{3+} + Ce^{3+} \rightarrow Fe^{2+} + Ce^{4+}$$

$Ce^{3+} \rightarrow Ce^{4+} + e$

Oxidation

$Fe^{3+} + e \rightarrow Fe^{2+}$

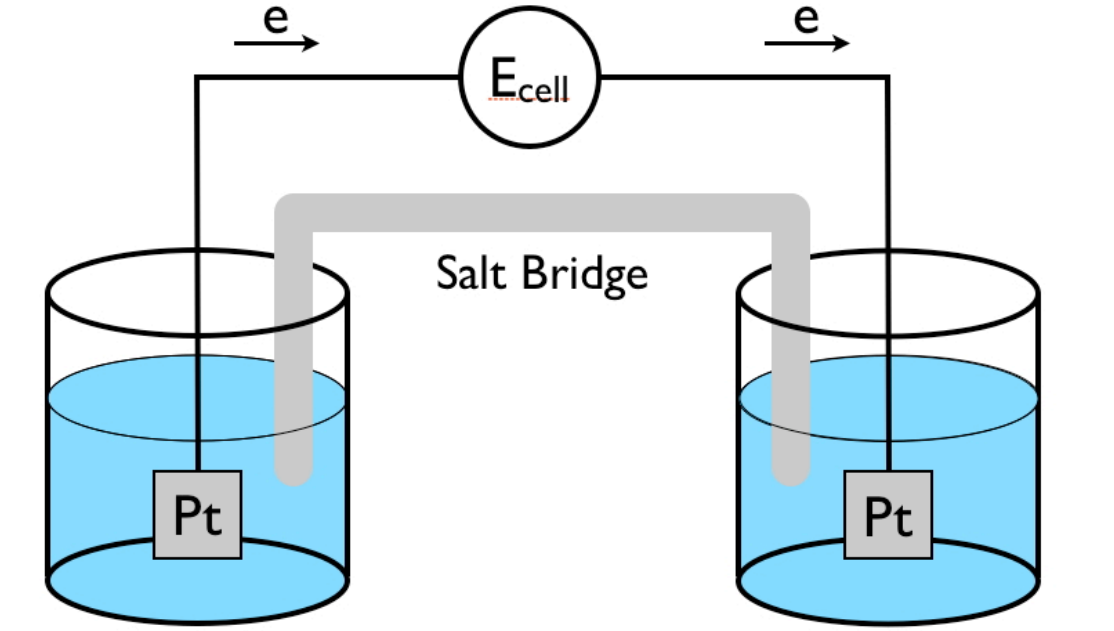
Reduction

Oxidation-Reduction Reactions

$$Fe^{3+} + Ce^{3+} \rightarrow Fe^{2+} + Ce^{4+}$$

$Ce^{3+} \rightarrow Ce^{4+} + e$ Oxidation

$Fe^{3+} + e \rightarrow Fe^{2+}$ Reduction



$Ce^{3+} \rightarrow Ce^{4+} + e$

$Fe^{3+} + e \rightarrow Fe^{2+}$

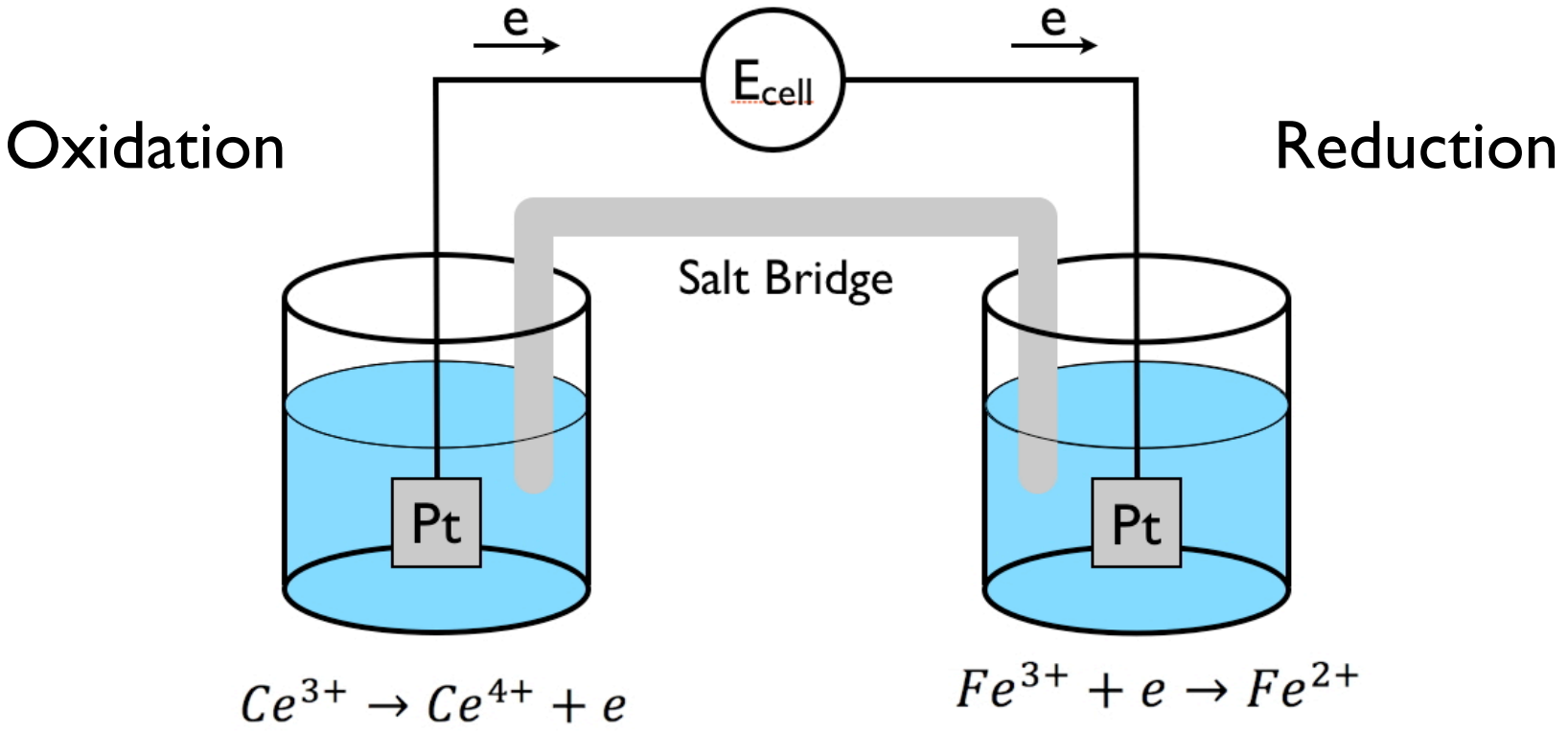
Oxidation-Reduction Reactions

$$\Delta G = -nFE_{cell}$$

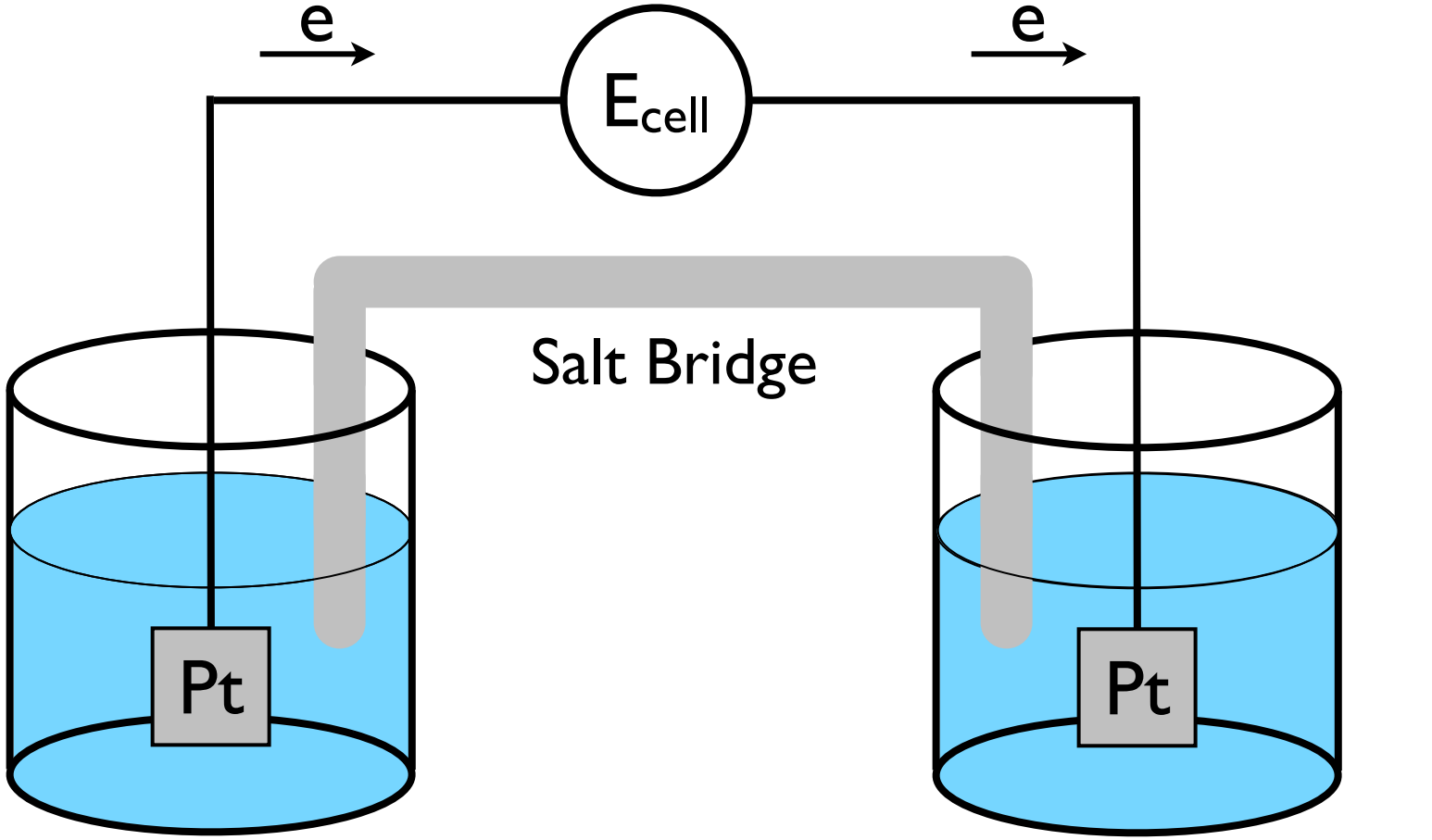
$$E_{cell} = E^0_{cell} - \frac{RT}{nF} lnQ$$

$$\Delta G = \Delta G^0 + RTlnQ$$

where $\Delta G^0 = -nFE^0_{cell}$



$$E_{cell} = E_{Fe} - E_{Ce}$$



$$Ce^{3+} \rightarrow Ce^{4+} + e$$

$$Fe^{3+} + e \rightarrow Fe^{2+}$$

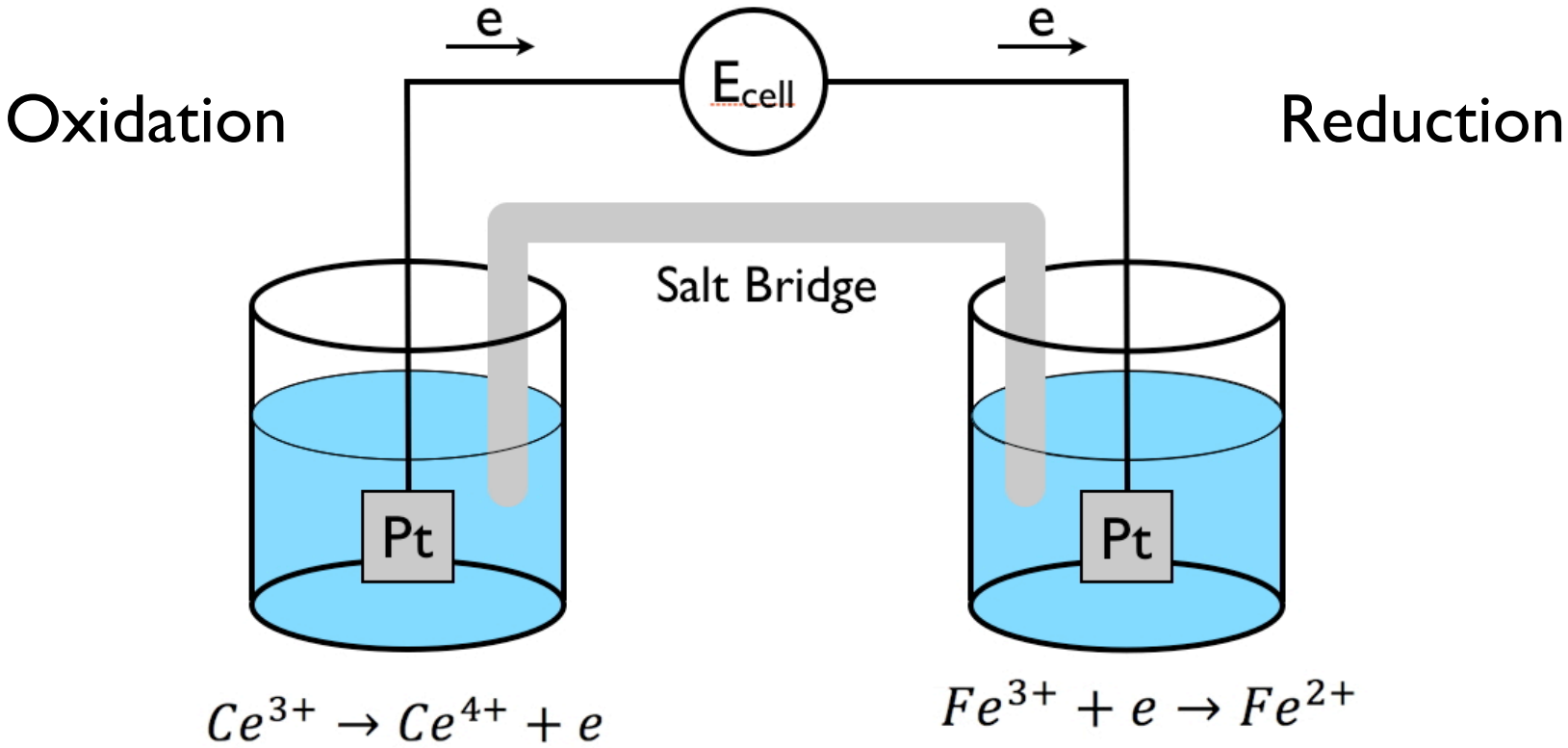
$$E_{cell} = E_{Fe} - E_{Ce}$$

$$Ce^{4+} + e \rightarrow Ce^{3+}$$

$$Fe^{3+} + e \rightarrow Fe^{2+}$$

$$E_{Ce} = E^0_{Ce} - \frac{RT}{F} ln \frac{[Ce^{3+}]}{[Ce^{4+}]}$$

$$E_{Fe} = E^0_{Fe} - \frac{RT}{F} ln \frac{[Fe^{2+}]}{[Fe^{3+}]}$$



Half Cell Reaction for Fe(II)/Fe(III)

$$Fe^{3+} + e \rightarrow Fe^{2+}$$

$$E_{Fe} = E^0_{Fe} - \frac{RT}{F} ln \frac{[Fe^{2+}]}{[Fe^{3+}]}$$

Half Cell Reaction for Hydrogen:

$$H^+ + e \rightarrow \frac{1}{2} H_{2(g)}$$

$$E_H = E^0_H + \frac{RT}{F} ln \frac{{P_{H_2}}^{1/2}}{[H^+]} \qquad E^0_H = 0$$