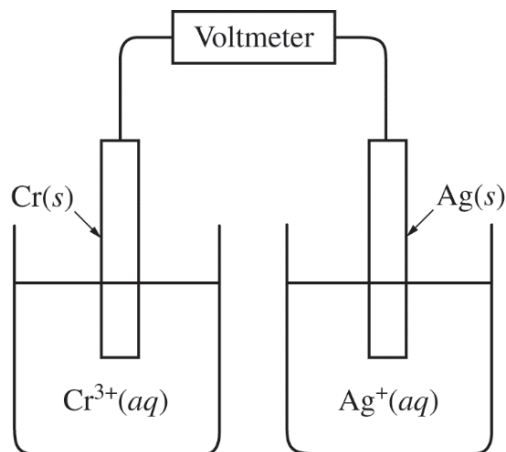




6. A student sets up a galvanic cell at 298 K that has an electrode of $\text{Ag}(s)$ immersed in a 1.0 M solution of $\text{Ag}^+(aq)$ and an electrode of $\text{Cr}(s)$ immersed in a 1.0 M solution of $\text{Cr}^{3+}(aq)$, as shown in the diagram above.
- (a) The student measures the voltage of the cell shown above and discovers that it is zero. Identify the missing component of the cell, and explain its importance for obtaining a nonzero voltage.

Half-Reaction	E° (V)
$\text{Ag}^+(aq) + e^- \rightarrow \text{Ag}(s)$	+ 0.80
$\text{Cr}^{3+}(aq) + 3 e^- \rightarrow \text{Cr}(s)$	?

- (b) The student adds the missing component to the cell and measures E°_{cell} to be +1.54 V. As the cell operates, Ag^+ ions are reduced. Use this information and the information in the table above to do the following.
- Calculate the value of E° for the half-reaction $\text{Cr}^{3+}(aq) + 3 e^- \rightarrow \text{Cr}(s)$.
 - Write the balanced net-ionic equation for the overall reaction that occurs as the cell operates.
 - Calculate the value of ΔG° for the overall cell reaction in $\text{J/mol}_{\text{rxn}}$.