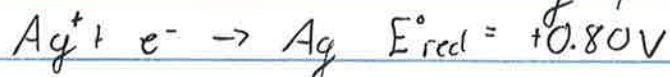
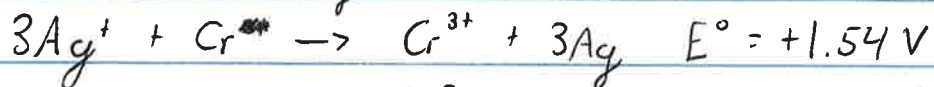


Today: Start ch 19  
 Tuesday: expt 12, problem club with Ali  
 lab TA applications available

What mass of silver is deposited at the same time as a Cr electrode loses 2.20g producing  $\text{Cr}^{3+}$



$$n_{\text{Cr}} = \frac{2.20\text{g}}{57.00\text{g/mol}} = 0.0423\text{ mol Cr}$$



$$n_{\text{Ag}} = \frac{0.0423\text{ mol Cr} \times 3\text{ mol Ag}}{1\text{ mol Cr}} = \frac{0.1269\text{ mol Ag} \times 107.9\text{g}}{\text{mol}} = \boxed{13.7\text{g Ag}}$$

• What is  $E^\circ$  for the following?  $\text{Cr}|\text{Cr}^{3+}(0.25\text{M})||\text{Ag}^+(0.10\text{M})|\text{Ag}$

$$E = E^\circ - \frac{0.0592}{n} \log Q_c$$

$$E = +1.54\text{V} - \frac{0.0592}{3} \log \left( \frac{(0.25)^3}{(0.10)^3} \right)$$

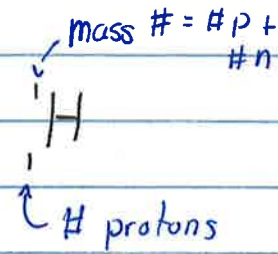
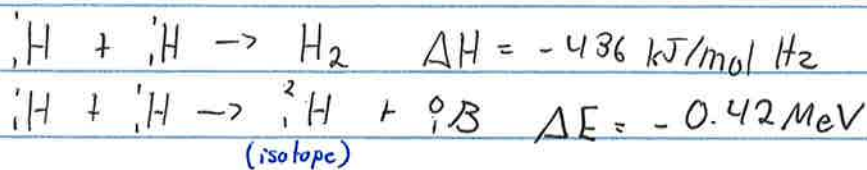
$$E = 1.54\text{V} - 0.0473 = \boxed{1.49\text{V}}$$

• How many moles of electrons are transferred during this reaction?

How many coulombs? <sup>charge</sup>

$$n_{e^-} = \frac{0.0423\text{ Cr} \times 3\text{ mol } e^-}{1\text{ mol Cr}} = \boxed{0.127\text{ mol } e^-}$$

$$\text{charge} = \frac{0.127\text{ mol } e^- \times 96500\text{ coul}}{1\text{ mol } e^-} = \boxed{12255.5\text{ coul}}$$



-0.42 MeV	$1.60 \times 10^{-13} \text{ J}$	$6.02 \times 10^{23}$	1 kJ	= <span style="border: 1px solid black; padding: 2px;"><math>-4.05 \times 10^7 \text{ kJ}</math></span>
1 MeV	mol	1000 J	releases much more energy	

time world      going to big world

• Isotopes

${}^{12}_6\text{C}$	${}^{13}_6\text{C}$	${}^{14}_6\text{C}$
6p	6p	6p
6n	7n	8n

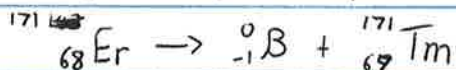
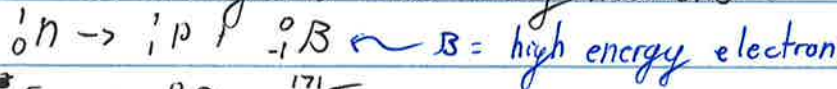
stable
unstable (radioactive),  
decays,  $t_{1/2} = 5730 \text{ yr}$

In upper atmosphere, high energy neutrons:

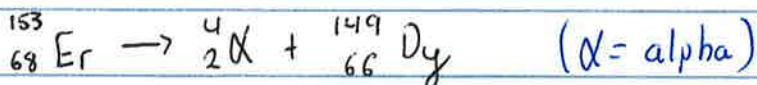
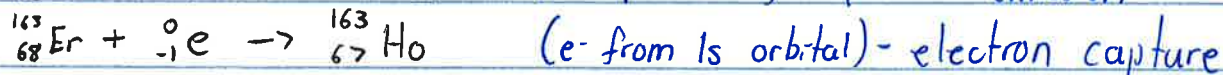
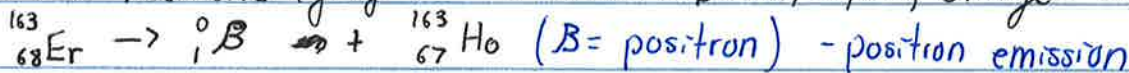


→  ${}^{14}\text{CO}_2$  → fuel chain

• light blue (from diagram) - too many neutrons (beta emission)



• too few neutrons (gray = positron emission or electron capture, orange = alpha emission)



• nuclear processes all follow first order kinetics

$$\ln \left( \frac{\text{decay counts}_0}{\text{decay counts}_t} \right) = kt \quad t_{1/2} = \frac{0.693}{k}$$