

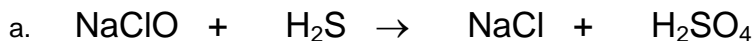
Chemistry 30

Unit 6: Redox Reactions and Electrochemistry

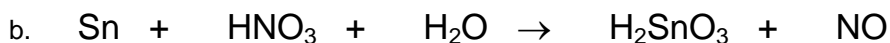
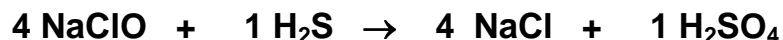
Assignment 2: Balancing Redox Reactions

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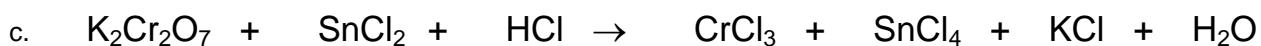
6 1. Balance the following reactions using the oxidation number method.



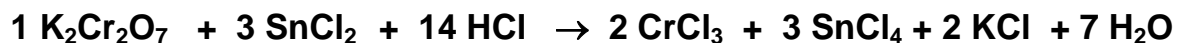
	initial	final	change		Coefficient		Total e ⁻
Cl	+1	→ -1	2	×	4	=	8
S	-2	→ +6	8	×	1	=	8

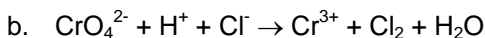


	initial	final	change		Coefficient		Total e ⁻
Sn	0	→ +4	4	×	3	=	12
N	+5	→ +2	3	×	4	=	12



	initial	final	change		no. atoms	No. e ⁻		Coefficient		Total e ⁻
Cr	+6	→ +3	3	×	2	6	×	1	=	6
Sn	+2	→ +4	2			2	×	3	=	6

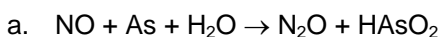




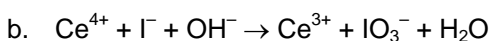
Remember to balance for atoms before adding electrons to balance for charge.

Step 1	Step 2	Step 3
Write the two balanced half-reactions, removing any spectator ions:	Balance electrons	Add the half-reactions, replacing any spectator ions that were removed and/or recombining compounds
$\text{CrO}_4^{2-} + 8 \text{H}^+ + 3 \text{e}^- \rightarrow \text{Cr}^{3+} + 4 \text{H}_2\text{O}$	$\times 2$	$2 \text{CrO}_4^{2-} + 16 \text{H}^+ + 6 \text{e}^- \rightarrow 2 \text{Cr}^{3+} + 8 \text{H}_2\text{O}$
$2 \text{Cl}^- \rightarrow \text{Cl}_2 + 2 \text{e}^-$	$\times 3$	$6 \text{Cl}^- \rightarrow 3 \text{Cl}_2 + 6 \text{e}^-$
added together:		$2 \text{CrO}_4^{2-} + 16 \text{H}^+ + 6 \text{Cl}^- \rightarrow 2 \text{Cr}^{3+} + 3 \text{Cl}_2 + 8 \text{H}_2\text{O}$

4 3. Balance the following reactions using either the oxidation number method or the half-reaction method.



	initial	final	change		no. atoms	No. e ⁻	Coefficient	Total e ⁻
N	+2	→ +1	1	×	2 (in N ₂ O)	= 2	×	3
As	0	→ +3	3			3	×	2
								= 6



Step 1	Step 2	Step 3
Write the two balanced half-reactions, removing any spectator ions:	Balance electrons	Add the half-reactions, replacing any spectator ions that were removed and/or recombining compounds
$\text{Ce}^{4+} + 1 \text{e}^- \rightarrow \text{Ce}^{3+}$	$\times 6$	$6 \text{Ce}^{4+} + 6 \text{e}^- \rightarrow 6 \text{Ce}^{3+}$
$\text{I}^- + 6 \text{OH}^- \rightarrow \text{IO}_3^- + 3 \text{H}_2\text{O} + 6 \text{e}^-$		$\text{I}^- + 6 \text{OH}^- \rightarrow \text{IO}_3^- + 3 \text{H}_2\text{O} + 6 \text{e}^-$
added together:		$6 \text{Ce}^{4+} + \text{I}^- + 6 \text{OH}^- \rightarrow 6 \text{Ce}^{3+} + \text{IO}_3^- + 3 \text{H}_2\text{O}$