Chemistry 30

Unit 6: Redox Reactions and Electrochemistry

Practice Set 2: Recognizing Redox Reactions

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1. For each of the following reactions, complete the summary table below the equation. If an element does not undergo any change, leave the last two columns blank

a. $4\ HCl + O_2 \rightarrow 2\ H_2O + 2\ Cl_2$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
H	+1	→	+1	0	--	--
Cl	-1	→	0	1	oxidized	reducing agent
O	0	→	-1	2	reduced	oxidizing agent

b. $4\ Al_{(s)} + 3\ O_{2(g)} \rightarrow 2\ Al_2O_3$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
Al	0	→	+3	3	oxidized	reducing agent
O	0	→	-2	2	reduced	oxidizing agent

c. $Fe_{(s)} + SnCl_{2(aq)} \rightarrow FeCl_{2(aq)} + Sn_{(s)}$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
Fe	0	→	+2	2	oxidized	reducing agent
Sn	+2	→	0	2	reduced	oxidizing agent
Cl	-1	→	-1	--	--	--

d. $PbO_2 + 4\ HI \rightarrow I_2 + PbI_2 + 2\ H_2O$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
Pb	+4	→	+2	gain 2 e^-	reduction	oxidizing agent – PbO_2
O	-2	→	-2	0		
H	+1	→	+1	0		
I (to I_2)	-1	→	0	lose 1	oxidation	reducing agent – HI
I (to PbI_2)	-1	→	-1	0		

2. For each of these reactions, determine whether or not it is a redox reaction. If any are, identify oxidizing and reducing agents in those reactions.

a. $CaBr_2 + Pb(NO_3)_2 \rightarrow PbBr_2 + Ca(NO_3)_2$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
Not a redox reaction – no substance undergoes a change in oxidation number.						

b. $P_4 + 5O_2 \rightarrow P_4O_{10}$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
P	0	→	+5	5	oxidized	reducing agent
O	0	→	-2	2	reduced	oxidizing agent

c. $SnCl_2 + 2\ FeCl_3 \rightarrow 2\ FeCl_2 + SnCl_4$

element	Initial Ox. No		Final Ox. No.	e^- gained or lost	Oxidized or reduced	Agent
Sn	+2	→	+4	2	oxidized	reducing agent
Fe	+3	→	+2	1	reduced	oxidizing agent