Redox of rechargeable Car Batteries

ANODE (oxidation) reaction $Pb° \rightarrow Pb^{2+} + 2e^-$

CATHODE (reduction) reaction $Pb^{4+} + 2e^- \rightarrow Pb^{2+}$

The total reaction can be written as

$Pb°_{(S)} + PbO_{2(S)} + 2H_2SO_{4(AQ)} \rightarrow 2PbSO_{4(S)} + 2H_2O_{(L)}$

At the same time, both the Pb° atoms and the Pb^{4+} cations change into +2 ions.

When atoms become cations ($Pb° \rightarrow Pb^{2+} + 2e^-$), *they lose electrons and oxidize.*

When +4 cations gain 2 electrons ($Pb^{4+} + 2e^- \rightarrow Pb^{2+}$), *they are reduced.*

There Is a great, short video on Arbuiso.com on the Redox Page (green box on right side of page, then scroll to bottom of handouts and homework. 4 minutes = you're smarter!

Redox of Hydrolysis of Water (Hoffmann Apparatus)

Water can be decomposed into hydrogen gas and oxygen gas with the Hoffmann Apparatus. Electricity is run into water (containing a bit of acid for electrical conduction). An oxidation + reduction occurs, converting the molecule water into its constituent elements.

Overall reaction: $2H_2O_{(L)} \rightarrow 2H_{2(G)} + O_{2(G)}$

Oxidation at anode: $2O^{-2} \rightarrow O_2°_{(G)} + 4e^-$

Reduction at cathode: $4H^+ + 4e^- \rightarrow 2H_2°$

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