# IV) Table of Standard Reduction Potentials

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*Go to the last page of the data booklet and investigate the redox table.*

What is listed on the left side? Oxidizing agents

Another description for the substances on the left side are things that gain e⁻ (reduction).

They are listed from top (strongest) to bottom (weakest). Notice that when you read the reactions from left to right, each is a reduction.

Notice that many of the strongest oxidizing agents are halogens and oxyanions.

What is on the right side? reducing agents

Another description for the substances on the right side are things that lose e⁻ (oxidize).

These are listed from strongest (BOTTOM) to weakest (TOP), like the bases on the acid-base table.

Notice that the oxidation half-reactions are from right to left on the table, as this shows electon(s) being given away.

What types of substances are the strongest reducing agents? (bottom, right) alkali + alkali earth metals (always form ⊕ cations)

The double arrow does not mean the reactions are at equilibrium; it means that the half-reactions can occur in either direction depending on the substances present in a reaction. Once you know the direction to use for a specific half-reaction (depending on whether it's an oxidation or reduction), use only a one-way arrow.

Why do some substances such as $Cu^+$, $H_2O_2$, & $Fe^{2+}$ appear on both sides of the table? They can oxidize in the presence of a stronger O.A. They can reduce in the presence of a stronger R.A.

Some metals have more than one common oxidation number, and therefore will have multiple half-reactions on the table (such as iron and copper). Locate all of the copper half-reactions on the table.

$Cu^{2+} + 2e^- \rightarrow Cu(s)$ $Cu^+ + e^- \rightarrow Cu(s)$

$Cu^{2+} + e^- \rightarrow Cu^+$

Be sure to use the correct half-reaction when dealing with these metals.

*NOTE charges carefully!!!

Some half-reactions require acidic conditions (meaning $H^+$ must be present), and some require basic conditions (meaning $OH^-$ must be present). *very rare*

$H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$ must be an acid.

$MnO_2 + 4OH^- \rightleftharpoons MnO_4^- + 2H_2O + 3e^-$

10