

OXIDATION-REDUCTION

<http://www.csun.edu/~hcchm001/IntroChemHandouts.html>

Oxidation-reductions reactions are prevalent in all aspects of our daily lives:

- ★ Extracting energy from foods (for all living things)
- ★ Burning of fossil fuels to drive our cars, heat our homes, and cook our foods (combustion)
- ★ Running of batteries to operate automobiles, lights, calculators, computers, etc.
- ★ Preparing materials for clothing, homes, computers, pharmaceuticals, etc.
- ★ Testing of blood, urine, and tissue samples

DEFINITIONS		
★ ★ ★ ★ OXIDATION ALWAYS OCCURS WITH REDUCTION ★ ★ ★ ★		
Example reaction: $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$ (not balanced)		
Oxidation is a process of losing e^-	decrease in ox. no.	$\text{Mg}^0 \rightarrow \text{Mg}^{2+} + 2e^-$ (Note: 0 to +2 is an increase)
Reduction is a process of gaining e^-	increase in ox. no.	$4e^- + \text{O}_2^0 \rightarrow 2\text{O}^{2-}$ (Note: 0 to -2 is a decrease)

HALF-REACTIONS

A special method using "half-reactions" is used to balance complex oxidation-reduction reactions:



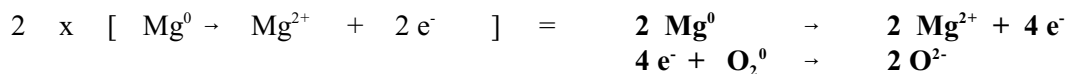
- electrons are always written on the product side
- the element undergoing oxidation always experiences an increase in ox. no.



- electrons are always written on the reactant side
- the element undergoing reduction always experiences a decrease in ox. no.
- * balance by inspection

3. OXIDATION ALWAYS OCCURS WITH REDUCTION: e^- lost = e^- gained

- Multiply one or both half reactions by a whole number to balance electrons lost with electrons gained:



- Add half reactions together, cancel electrons, and simplify if necessary to obtain the final balanced equation:

