

# Oxidation-Reduction rxns (Redox)

oxidation - become more + or lose  $e^-$ 's

reduction - become more - or gain  $e^-$ 's

Types



① Combustion - burn something ( $C_xH_yO_z$ )



where found? burn anything - wood, propane,  
methane

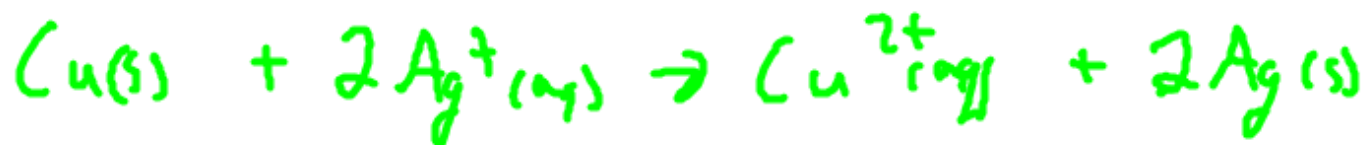
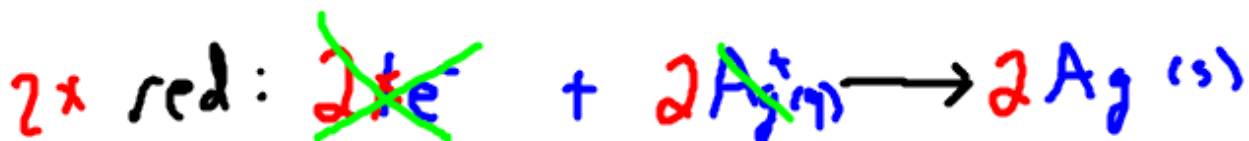
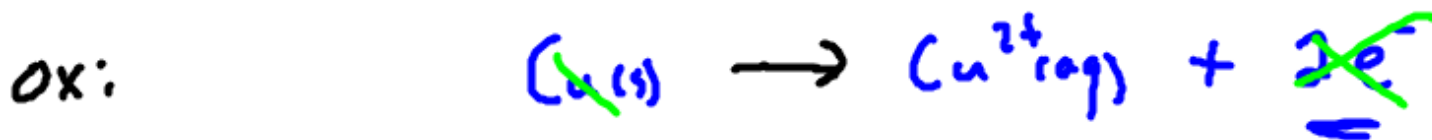
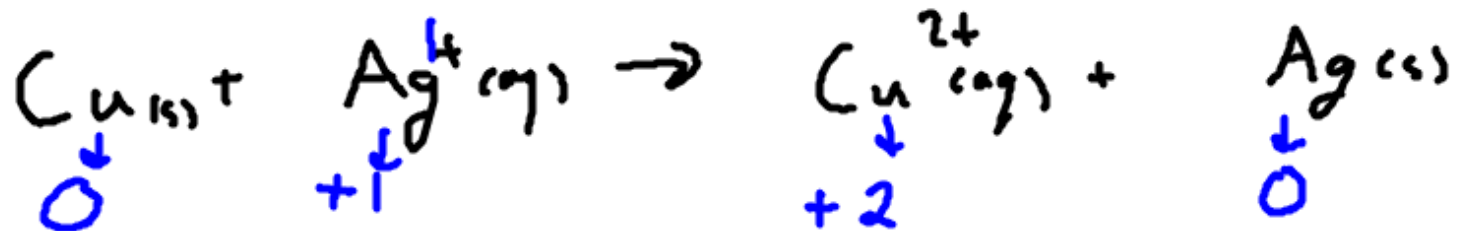
Importance of combustion rxns

- produce energy

primary fuel in body glucose

Cellular respiration - uses glucose +  $O_2$

Ox-red example for Inorganic

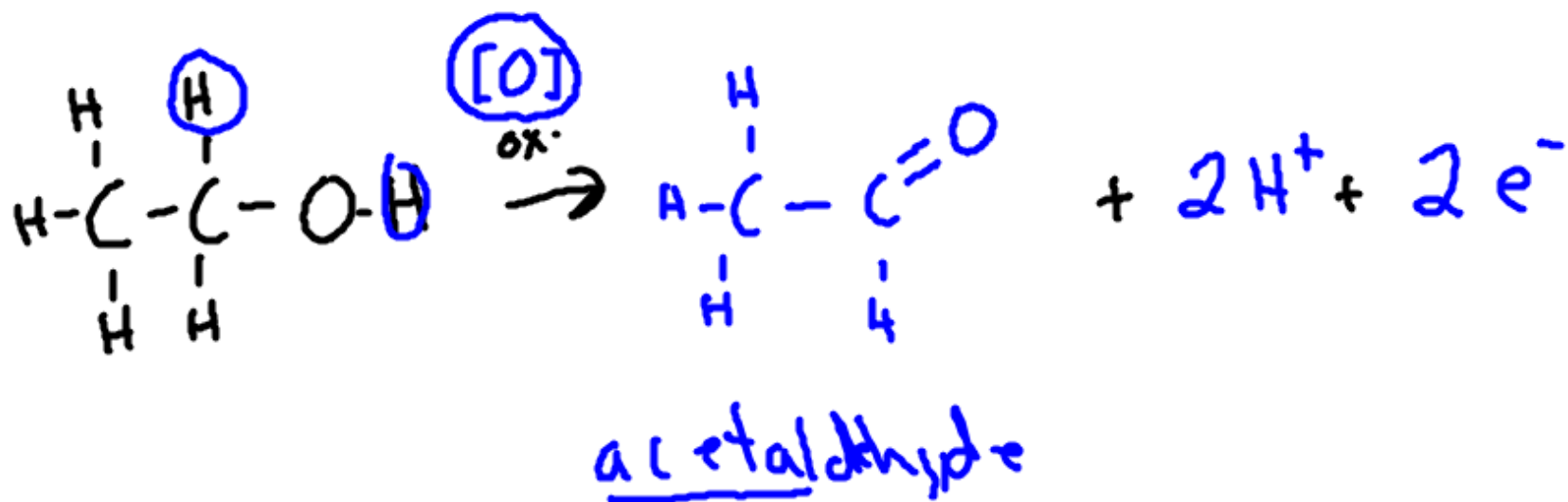


# Ox-Red in Organics

focus on # of H's and/or O's in molecule

Oxidation:  $\uparrow O$   $\downarrow H$

Reduction:  $\downarrow O$   $\uparrow H$

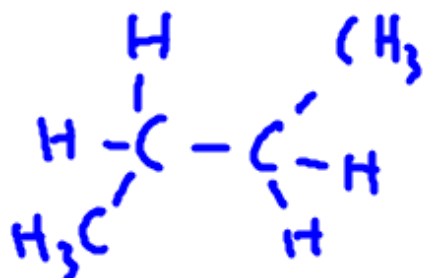
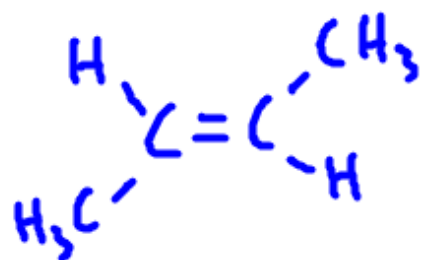


Coenzymes - reactants in the body receiving  $e^-$ 's

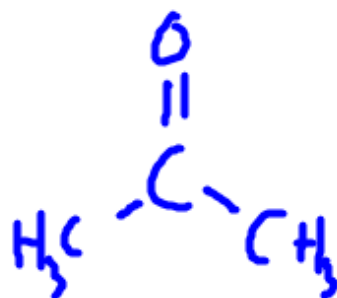
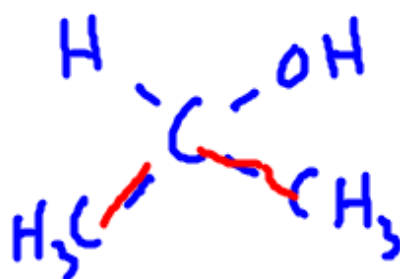
- shuttle  $e^-$ 's between I's & O's

Oxidizing agent - thing that gets reduced

reducing agent - thing that gets oxidized



ox or red



ox or red

## Catalytic hydrogenation



unsaturated compound and make it saturated

where used? margarine

unsat fats  $\rightarrow$  sat fats

"hydrogenated" or "partial hydrogenated"

\ ox - lose  $e^-$ 's

$\uparrow$  O  $\downarrow$  H

red - gain  $e^-$ 's

$\downarrow$  O  $\uparrow$  H

[O]  $\rightarrow$  oxidation

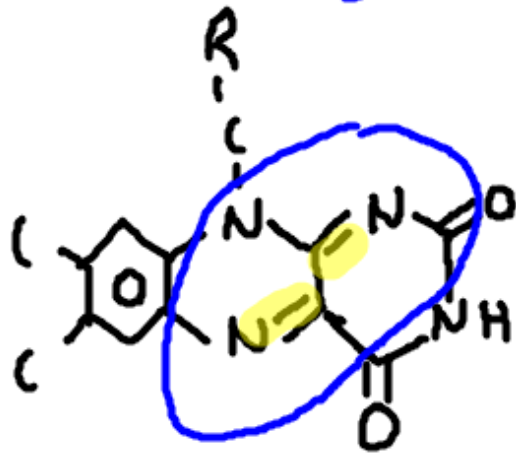
[H]  $\rightarrow$  reduction



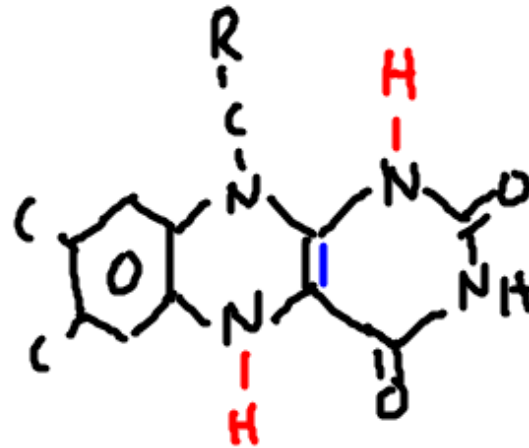
Coenzyme  $\text{FAO}/\text{FAOH}_2$

flavin

adenine dinucleotide



FAO



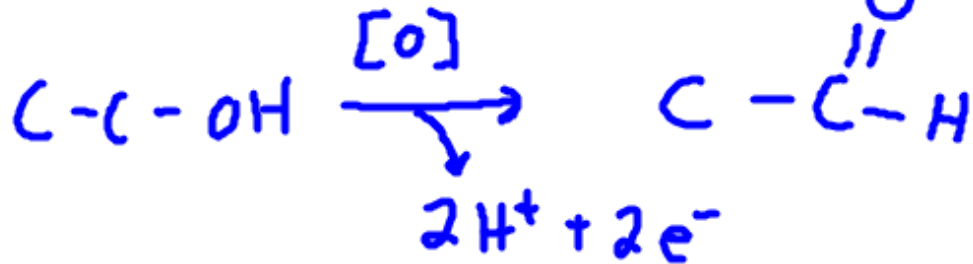
FAOH<sub>2</sub>

from the vitamin riboflavin

Ox-Red involving C-O bonds  
alcohols and carbonyl (C=O)

Alcohols

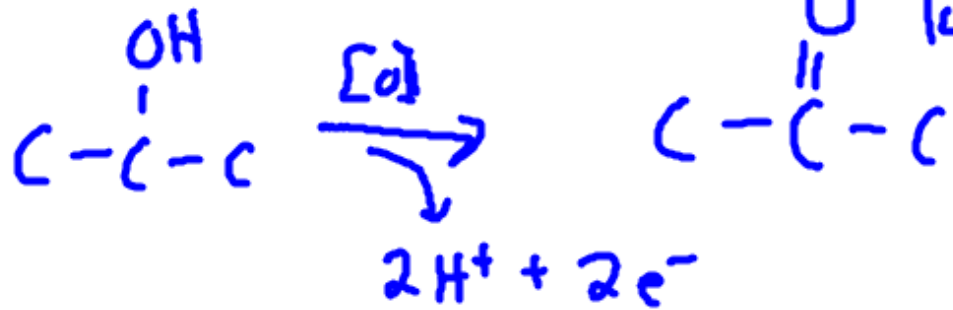
primary  $\rightarrow$



aldehyde



secondary  $\rightarrow$

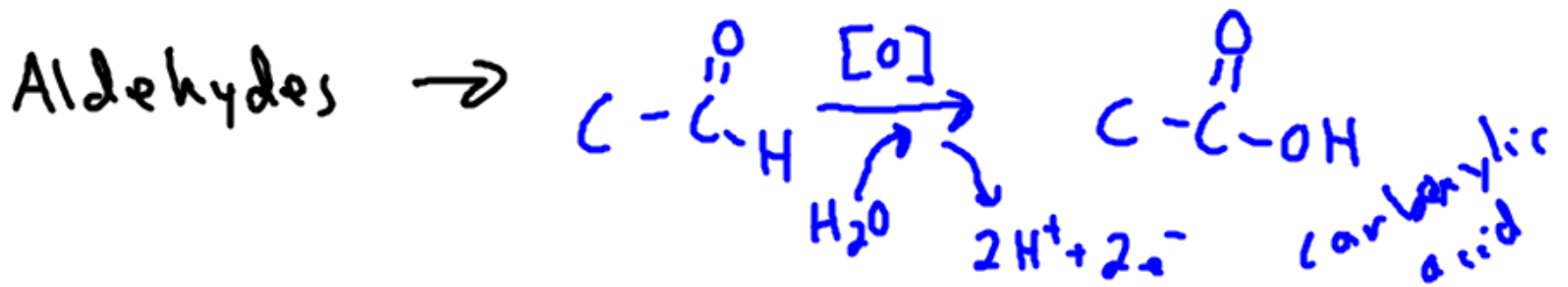


ketone



tertiary  $\rightarrow$  no oxidation

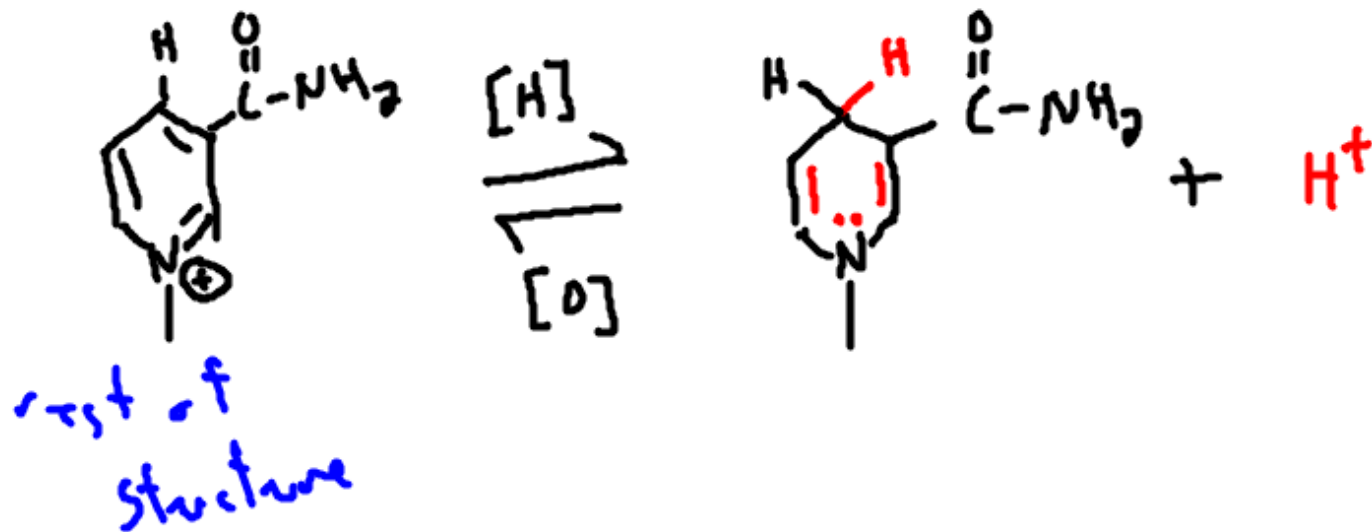




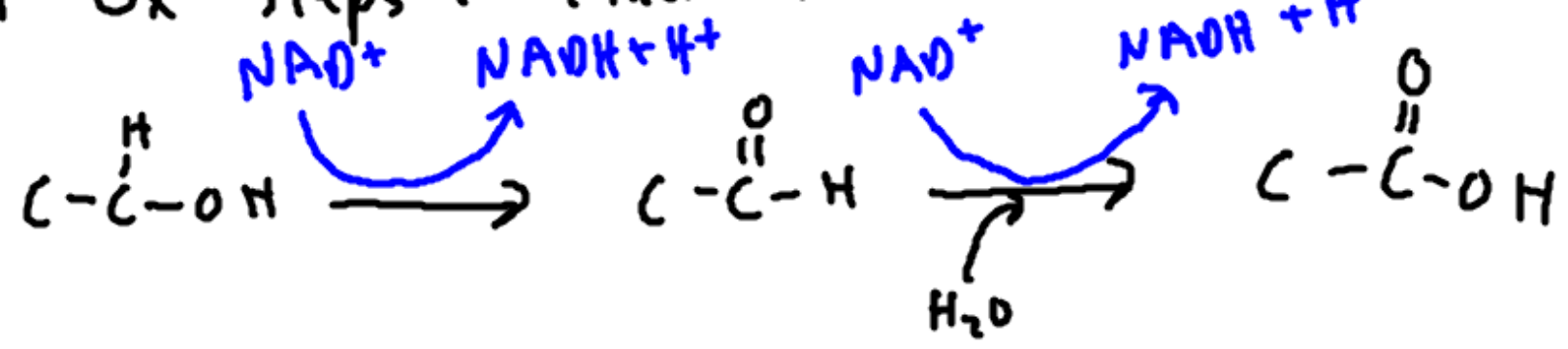
Coenzyme  $\text{NAD}^+ / \text{NADH}$

nicotinamide adenine dinucleotide

from vitamin niacin = vit B<sub>3</sub>



1<sup>st</sup> Ox steps in ethanol metabolism



# Anti oxidants

believed roles: - prevent cancer  
- cardiovascular disease

associated: - slow outward signs of aging

how do they work - reduces harmful oxidizing agents

where do they come from? fruits, vegs + glutathione

