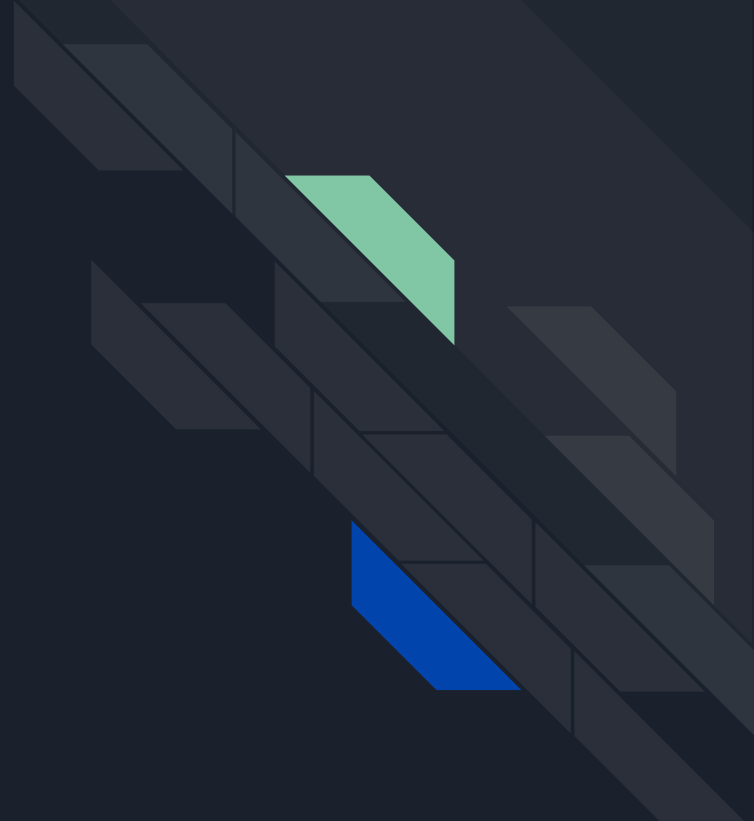


A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front parallelogram is blue and the back one is a light green color. Both are oriented diagonally from the top-left towards the bottom-right.

Chemistry of Alcohol Engines

How an Internal Combustion Engine Works



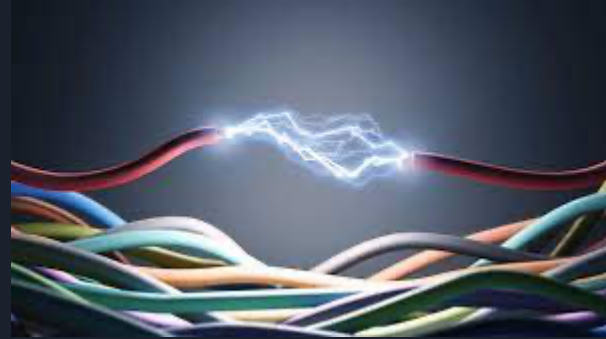
Where and why do we use alcohol engines?

- Racing
- “Safer” Fire
- Byproduct of oxygen when it combusts
- Cooling effect when it vaporizes



Gasoline vs. Alcohol

- Less energy per capita than gas
- Gas is non-conductive
- Gas is less corrosive



Differences in Alcohol and Gas Engines

- Ethanol is more corrosive, so there can't be any exposed aluminum, magnesium, or rubber components in the fuel system
- Fuel injectors must be controlled differently because more ethanol is required to create the same power
- Ethanol is conductive, so special precautions are taken on pumps mounted on the tanks to prevent arcing



Combustion Reactions

- Products are water and carbon dioxide
- Exothermic reaction
- Initiated by spark plugs



Chemical Equations

Methanol: $2\text{CH}_3\text{OH}(\text{l}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\text{l})$

Ethanol: $\text{C}_2\text{H}_5\text{OH}(\text{l}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l})$





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