

Chemical Equilibrium Project

BY Parker Spencer

What is this project?

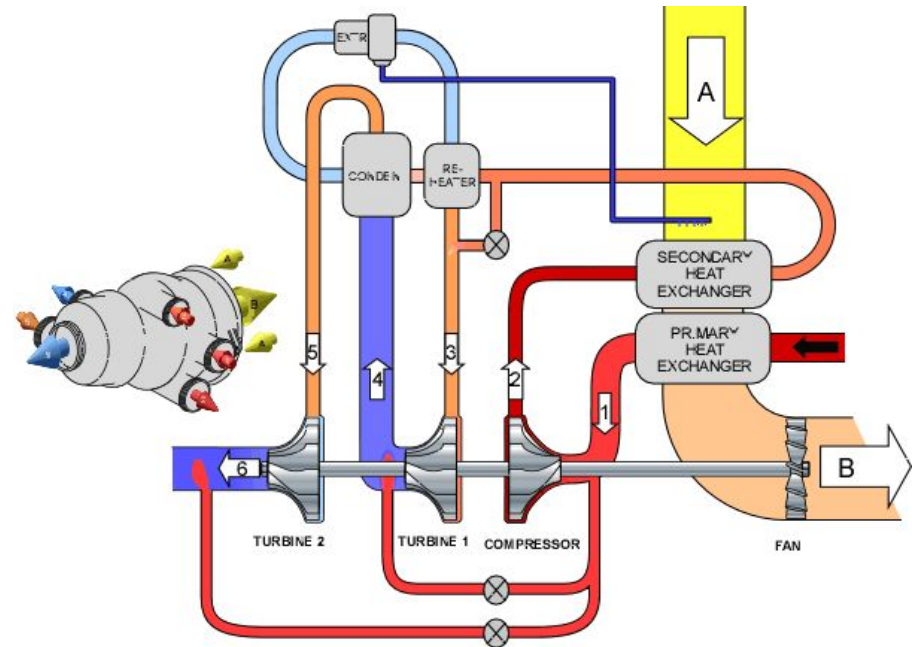
This project is going to be used to explore the chemical equilibrium that occurs in in everyday aspects of our lives. This includes internal and external areas of our lives that have a chemical equilibrium. These areas include both mental or physical aspects depending on what the topic is. Each student got a list to choose from and has to research and share their findings.

Topic

The topic that i chose for my project was cabin pressure and how it relates to chemical equilibrium. I chose cabin pressure because it shows how important equilibrium is in the aviation industry. In addition it shows how everyday transportation relates to equilibrium. THis relation will hopefully educate you on how important equilibrium is in aircraft and everyday life.

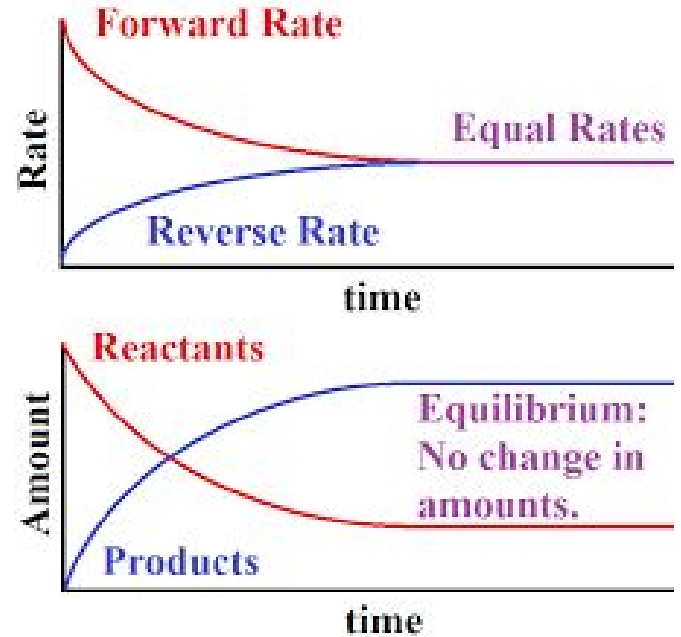
What is cabin pressure?

Cabin pressure works by taking air pressurized by the engines and cooling it down with intercoolers in the hull of the plane. Once the air is cooled it is filtered and pumped into the cabin. The air needs to be cooled and filtered unless it would be too hot and potential toxic for humans to breath.



What is equilibrium?

Equilibrium is the change in the state that is made the by the products and reactants being equal. When they are equal there is an equilibrium when they are not equilibrium the reaction changes and is not at an equal state. This change in equilibrium can be caused by changes in concentration, pressure, and temperature.



How does cabin pressure relate to equilibrium?

Cabin pressure in an airplane has a constant equilibrium while maintaining altitude. While the plane is flying pressurized air is being pumped into the cabin so that there is enough air to breathe. This equilibrium consists of keeping the different pressures at different altitude. The higher the altitude the more air pressure is needed for the flight crew and passengers. As the plane drops in altitude so does the air pressure. If the fuselage is ruptured the equilibrium is destroyed and the cabin pressure will drop in relation to the size of the hole.

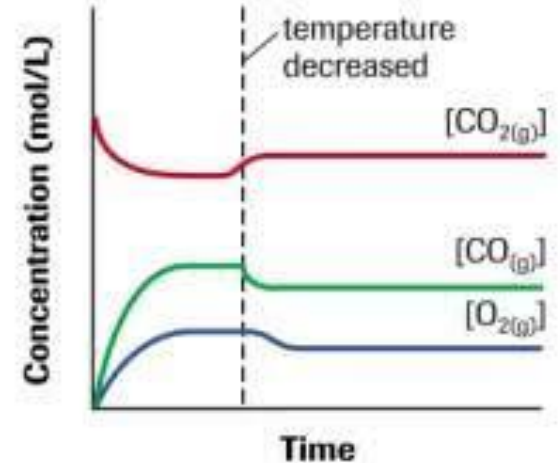
What would happen if cabin pressure went out of equilibrium?

If cabin pressure went out of equilibrium it could be caused by many factors such as a hole or a valve being opened. This would cause the pressure to drop depending on the size of the hole and the equilibrium would be destroyed. This would lead to not only unconsciousness but also hypothermia due to the high altitude.



Chemistry behind cabin pressure equilibrium

One of the most important parts of the cabin pressurization system is cooling. If more heat is added or taken away it upsets the equilibrium. If it increases the coolers can cool the air down and if it's too cold the cabin will be too cold for occupants. In Le Chatelier's principle he examines how temperature has a large effect on equilibrium as you can see in the example graph. This changes the endothermic reaction and the products that are produced.



How has cabin pressure changed aviation?

Cabin pressure has had a profound affect on the growth of aviation. Pressurizing the pressure of the cabin has aloud planes to fly higher and even shuttles to go into space. Without this equilibrium that is created altitude sickness, hypoxia, decompression sickness, barotrauma would occur. This limited the aviation industry until cabin pressurization was invented.



Thank you