

Pollution Converter

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Abstract:

There are many pollution Converters available in the market which is made up of platinum and other costly metals, which costs around 7-10 lakhs in order to install it in vehicle. In spite of charging that much money they can either eliminate only sulfur oxides or nitrogen dioxides both cannot be eliminated by them. And coming to carbon monoxides they convert them into carbon dioxide and leave it to the atmosphere, but still carbon dioxide is also dangerous and contributes to global warming. But my project is eliminating all the gases and converting them into harmless gases and release it to environment.

We know that in order to move a vehicle the fuel must be burnt to move it. But there are a lot of gases releasing after burning of fuel. Which is very harmful to us and our environment? The gases which are released after burning are mainly carbon monoxide, carbon dioxide, sulfur dioxide and nitrous oxides. Sulfur and nitrogen oxides are less in quantity but they are harmful to our environment. This project is completely based on the conversion of all the gases which are listed that is carbon monoxide, carbon dioxide, sulfur dioxide and nitrous oxides, all these harmful gases are converted into harmless components and released into the environment. The main aim of this paper is to reduce air pollution caused by not only vehicles but also Industries Factories. This project is not only applicable to bikes, cars all vehicles but also the big factories and Industries also. The first two experiments were failed after that the third experiment took wonderful approach.

Key Words: Sox, Nox, Particulate matter, Hydro Carbons, Carbon Monoxide, Graphite electrodes.

1. Introduction

Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint.

Air pollution is the introduction of particulates, biological molecules, or other harmful materials into Earth's atmosphere, causing diseases, death to humans, damage to other living organisms such as animals and food crops, or the natural or built environment. Air pollution may come from anthropogenic or natural sources.

The atmosphere is a complex natural gaseous system that is essential to support life on planet Earth.

Indoor air pollution and urban air quality are listed as two of the world's worst toxic pollution problems in the 2008 Blacksmith Institute World's Worst Polluted Places report. According to the 2014 WHO report, air pollution in 2012 caused the deaths of around 7 million people worldwide.

2. The ingredients of air pollution

Cars and trucks produce air pollution throughout their life, including pollution emitted during vehicle operation, refueling, manufacturing, and disposal. Additional emissions are associated with the refining and distribution of vehicle fuel.

Air pollution from cars and trucks is split into primary and secondary pollution. Primary pollution is emitted directly into the atmosphere; secondary pollution results from chemical reactions between pollutants in the atmosphere.

The following are the major pollutants from motor vehicles:

- **Particulate matter (PM).** These particles of soot and metals give smog its murky color. Fine particles — less than one-tenth the diameter of a human hair — pose the most serious threat to human health, as they can penetrate deep into lungs. PM is a direct (primary) pollution and a secondary pollution from hydrocarbons, nitrogen oxides, and sulfur dioxides. Diesel exhaust is a major contributor to PM pollution.

- **Hydrocarbons (HC).** These pollutants react with nitrogen oxides in the presence of sunlight to form ground level ozone, a primary ingredient in smog. Though beneficial in the upper atmosphere, at the ground level this

gas irritates the respiratory system, causing coughing, choking, and reduced lung capacity.

- **Nitrogen oxides (NOx).** These pollutants cause lung irritation and weaken the body's defenses against respiratory infections such as pneumonia and influenza. In addition, they assist in the formation of ground level ozone and particulate matter.

- **Carbon monoxide (CO).** This odorless, colorless, and poisonous gas is formed by the combustion of fossil fuels such as gasoline and is emitted primarily from cars and trucks. When inhaled, CO blocks oxygen from the brain, heart, and other vital organs. Fetuses, newborn children, and people with chronic illnesses are especially susceptible to the effects of CO.

- **Sulfur dioxide (SO₂).** Power plants and motor vehicles create this pollutant by burning sulfur-containing fuels, especially diesel. Sulfur dioxide can react in the atmosphere to form fine particles and poses the largest health risk to young children and asthmatics.

- **Hazardous air pollutants (toxics).** These chemical compounds have been linked to birth defects, cancer, and other serious illnesses. The Environmental Protection Agency estimates that the air toxics emitted from cars and trucks — which include Benzene, acetaldehyde, and 1,3-butadiene — account for *half* of all cancers caused by air pollution.

- **Greenhouse gases.** Motor vehicles also emit pollutants, such as carbon dioxide, that contribute to global climate change. In fact, cars and trucks account for over one-fifth of the United States' total global warming pollution; transportation, which includes freight, trains, and airplanes, accounts for around thirty percent of all heat-trapping gas emissions.

3. Theory:

Three experiments conducted in order to achieve this project.

3.1. First Experiment:

In this Experiment the water is electrolyzed by using carbon electrodes and 9-12 Volt Battery(which is available in vehicles) by which they split up into two components

hydrogen and oxygen and that hydrogen is collected and utilized for the reaction. Oxygen which is obtained is left out to the environment.

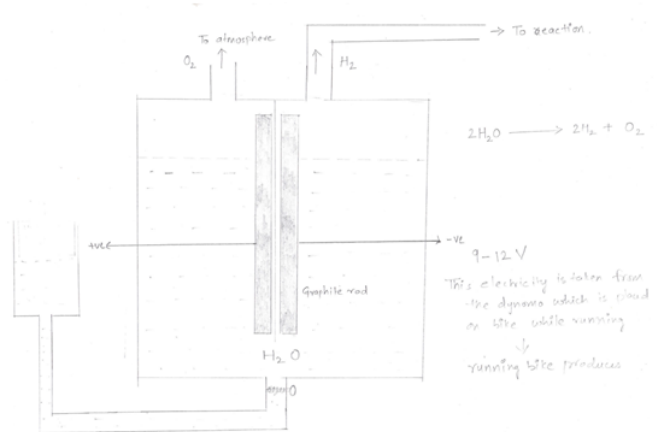
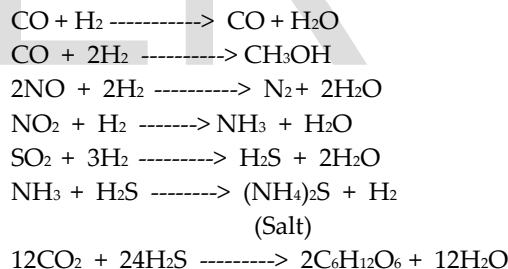


Fig 3.1

In this experiment Hydrogen is reacted with the flue gas, and the following reactions occur:



But, in this process the production of hydrogen is very less and the cost of production of hydrogen is more. Hence the Experiment is failed.

3.2 2nd Experiment:

In this Experiment the Bike Silencer is fitted with a case and is extended in some length.

3.2.1 Build:

This figure consists of five parts:

1st Part: Bike Silencer

2nd Part: Above the Bike Silencer, H₂O Tank fitted with carbon Electrodes

3rd Part: Extension of Silencer, from where flue gases come out

4th part: above the part 3, there is a H₂O tank.

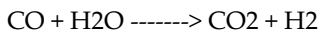
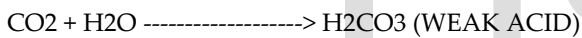
5th Part: Above the 4th part there is NaOH Tank.

3.2.2. Working:

The First Part which is Bike Silencer gradually become heat as the fuel is burned, due to that the water present above that becomes hot. In comparison with cold water hot water splits into hydrogen and oxygen more faster in presence of carbon electrodes. After splitting into the components H₂ and O₂, H₂ will pass through the channel provided just above the cathode. That H₂ will be utilized in the outer chamber to neutralize the harmful gases. The flue gas which is coming out of the Silencer is allowed to react with water which sprinkled on the gas while it come out of it. After the reaction of flue gas with H₂O in the extension of silencer it will move to the next chamber to react with nitrogen.

Reactions occur as follow:

In first chamber:



In the second chamber:

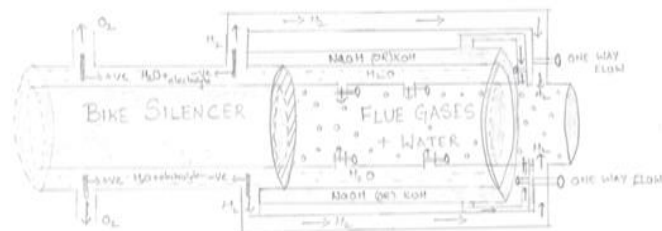
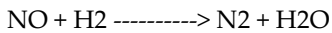


Fig 3.2

3.3. 3rd Experiment:

The final experiment in which the process is same but, here the water is not thrown out but it is recycled in this experiment which is more effective and the roads only component that is thrown out is nitrogen. And while cleansing salts are washed out.

The previous experiment is rejected because in that a lot of complications are arising as to when the water should be released, how much water should be release, when will the flue gases come out and is that time sufficient for the reaction of water and flue gases.

So, I closed the chamber and allowed sufficient water to reach with the flue gases and after the reaction Nitrogen Oxide is allowed to react with the hydrogen gas in a capillary tube.

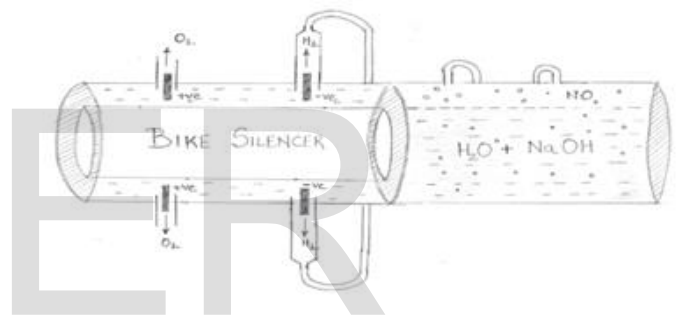


Fig 3.3.1

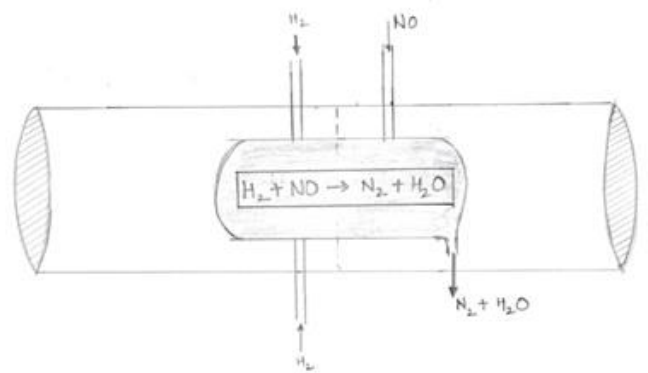


Fig 3.3.2

Conclusion:

This will reduce the Pollution and help to conquer the pollution free world, no matter how much pollution we do, it will give zero effect. It is very much cheaper in comparison to the catalytic Converters and catalytic Converter can only remove the particular pollutants but this pollution Converter will help to remove all the pollutants from the flue gases coming out from the vehicles as well as Industries.

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