

OZONATION OF EXHAUST GASES

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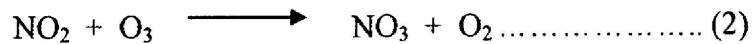
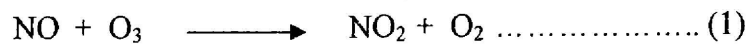
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ABSTRACT

Basically, exhaust gases for combustion process is containing gases such as NO_x , CO , SO_2 and other gases. The NO_x gases is formed when nitrogen and oxygen atoms in the air react under the high pressure and temperature conditions in an engine. When NO_x released to the atmosphere, it will cause the depletion of atmosphere ozone, O_3 . The reaction between NO_x and O_3 are;



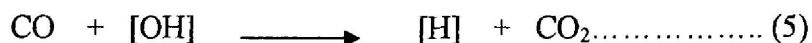
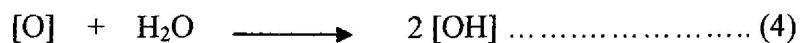
Where;



With ozone present in the reaction (1), all nitric oxide is converted to nitric dioxide. While in the reaction (2), nitric trioxide and oxygen is produced from the reaction between nitric dioxide, NO_2 and ozone, O_3 . Both reaction above can be advantageously used for cleaning an exhaust gases by injecting O_3 into exhaust gases stream.

More over, carbon monoxide, CO also can enhance the reaction in order to clean the exhaust gases which emissions come from million motor vehicles nowadays. The reaction of CO can be shown as below;





In the absence of volatile organic compounds, OH primarily derive from photochemical reactions of ozone in the reaction (3) and (4). Other oxidants present in the unpolluted troposphere (OH, OOH) can oxidize NO and produce nitric dioxide, NO₂ as shown in the reaction (6). While nitric dioxide, NO₂ participate in the buildup of ozone, regenerated OH and available CO keep the reaction going on and on. It is noted how the CO oxidation can enter the cycle in the reaction (5).

The main objective of this project is to study the variation of rates for the above reactions with different concentrations of CO in order to determine the effect of CO on the ozonation of exhaust gases.