Science Clarified Name:_____ Block:_____

Mark the Text & Summary Directions

1. Read the article.
2. Then read the article again and number the paragraphs.
3. Read the article for a third time while circling key words and underlining key concepts/ scientific claims
4. Lastly, write a scientific summary about the article on the back

Catalysts - Real-life applications

A DANGEROUS CATALYST IN THE ATMOSPHERE.

Around the same time that automakers began rolling out models equipped with catalytic converters, scientists and the general public alike became increasingly concerned about another threat to the environment. In the upper atmosphere of Earth are traces of ozone, a triatomic (three-atom) molecular form of oxygen which protects the planet from the Sun's ultraviolet rays. During the latter part of the twentieth century, it became apparent that a hole had developed in the ozone layer over Antarctica, and many chemists suspected a culprit in chlorofluorocarbons, or CFCs.

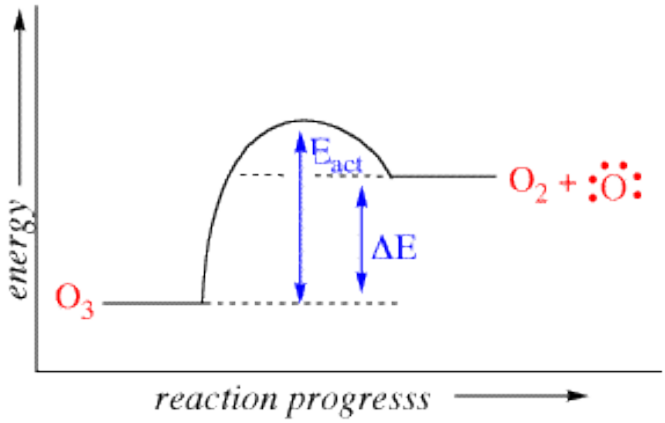
CFCs had long been used in refrigerants and air conditioners, and as propellants in aerosol sprays. Because they were nontoxic and noncorrosive, they worked quite well for such purposes, but the fact that they are chemically unreactive had an extremely negative side-effect. Instead of reacting with other substances to form new compounds, they linger in Earth's atmosphere, eventually drifting to high altitudes, where ultraviolet light decomposes them. The real trouble begins when atoms of chlorine, isolated from the CFC, encounter ozone.

Chlorine acts as a catalyst to transform the ozone to elemental oxygen, which is not nearly as effective as ozone for shielding Earth from ultra-violet light. It does so by interacting also with monatomic, or single-atom oxygen, with which it produces ClO, or the hypochlorite ion. The end result of reactions between chlorine, monatomic oxygen, hypochlorite, and ozone is the production of chlorine, hypochlorite, and diatomic oxygen—in other words, no more ozone. It is estimated that a single chlorine atom can destroy up to 1 million ozone molecules per second.

Below is the chemical equation for the conversion of O_3 into O_2 with the addition of the Cl atoms as a catalyst.

$$2\ O_3(g) \xrightarrow{Cl} 3\ O_2(g)$$

The Cl atoms speed up the conversion of ozone into elemental oxygen by lowering the activation energy for the reaction.



Due to concerns about the danger to the ozone layer, an international agreement called the Montreal Protocol, signed in 1996, banned the production of CFCs and the coolant Freon that contains them. But people still need coolants for their homes and cars, and this has led to the creation of substitutes—most notably hydrochlorofluorocarbons (HCFCs), organic compounds that do not catalyze ozone.

Read more: http://www.scienceclarified.com/everyday/Real-Life-Chemistry-Vol-2/Catalysts-Real-life-applications.html#ixzz4Y7iKYWoP

Now, write a scientific summary about this mini article: