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.

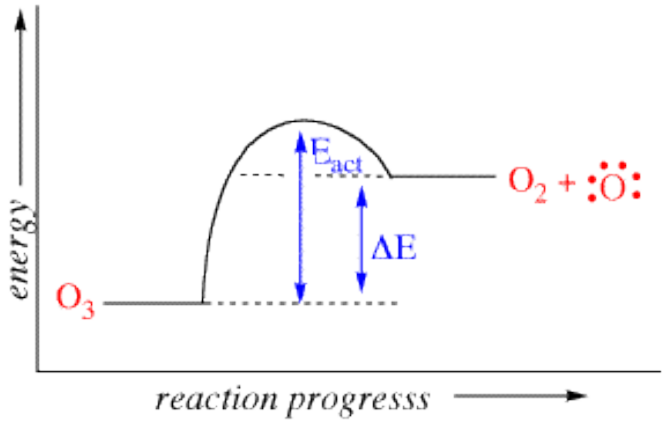
CFCs had long been used in refrigerants and air conditioners, and as propellants in aerosol sprays. Because they were nontoxic and noncorrosive, they worked quite well for such purposes, but the fact that they are chemically unreactive had an extremely negative side-effect. Instead of reacting with other 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:

Harmless Flour is an Incredibly Explosive Substance

BY ANUPUM PANT

Background

The next time you are biting off from a bread, pizza, pancake or a doughnut, you should probably take a minute and pay a silent acknowledgement to the people who work in flour mills to bring flour to your homes. Yes, because flour, the seemingly harmless cooking ingredient can be an incredibly dangerous substance – It explodes.
Wait a minute. It isn't a minor explosion I'm talking about. I'm talking about really big explosions. Read on to know more.

Burning Flour

Flour is almost completely starch (or carbohydrate). Since Carbohydrate is nothing but a large molecule which is essentially a couple of sugar molecules linked to each other, it burns like sugar. And everybody who has tried burning marshmallows on a candle knows how easily sugar catches fire. Agreed, carbohydrate isn't as sweet, but it is just like its cousin sugar when it comes to flammability.

So, that is how flour can catch fire. But what is it that makes it bring down full-sized buildings?

Flour in air

Flour in your kitchen's flour container can be a very boring thing. The fun starts when the tiny flour particles are suspended in air.

Flour particles suspended in air, or for that matter, almost anything suspended in air that can catch fire, is a dangerous thing. For example, look at one of the most hazardous situation you can have in a coal mine – There is coal dust around and accidentally there is a small sparkle around it. The whole place explodes like a bomb. This has resulted in some of the worst ever mining accidents in the history.

Such explosions happen because anything that is in powdered form and is suspended in air, has a far more surface area exposed to oxygen per unit weight, than normal lumps of the same substance. This is true for industrial stuff like powdered coal, sawdust, and magnesium. Besides that, mundane substances can explode too – like grain, flour, sugar, powdered milk and pollen.

All it takes to cause a disaster is a suspended combustible powder and a little electric arc formed from electrostatic discharge, friction or even hot surfaces – A little spark is enough.

Such settings are common in flour mills, where there is flour floating around literally everywhere. This is what caused a giant explosion in a flour mill in Minnesota on May 2nd, 1878, killing 18 workers. But that was more than 100 years ago. Kitchens are relatively safe because you don't have enough flour in the air to catch fire and produce great volumes of air that are enough to cause an explosion.

This happens even today. From the year 1994 to the year 2003 there have been 115 such reported explosions in food processing industries in the US.

Now, write a scientific summary about this mini article: