The purpose of this assignment is to explain the professional or technical complicated term to the non-technical readers by using the three definitions: a parenthetical definition, a sentence definition, and an expanded definition. These three different definitions should be distinguished, based on the levels of details, and the appropriate level of information should be selected along with the situation. The students should recognize how definitions are significant in technical writing depending on who the audience is and what the purpose is.

I have chosen the complex word, "catalyst." This word is significant for chemists so that I explained this term to non-technical readers; hopefully, the readers can realize its importance.

Reading situation: Chemists or biochemists use the term in their lab, especially when they want to make a reaction faster.

Parenthetical definition: A catalyst (a chemical term, meaning an accelerator) is applied in various specific conditions in a chemical reaction.

Sentence definition: A catalyst is a special substance which leads to proceeding chemical reactions faster without the catalyst being affected.

Expanded definition:

Catalyst

What is the Etymology of a Catalyst?

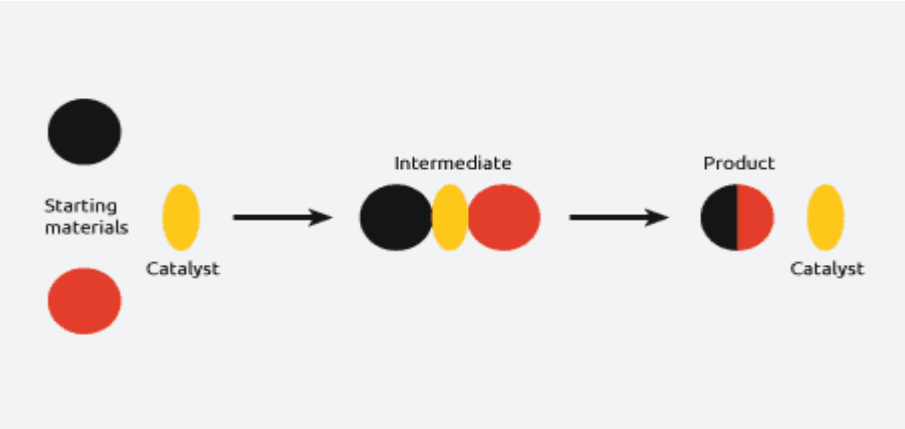
The term "catalyst" is a fairly recent word added to English language in the 20. century with its chemical meaning. This term came from catalysis, which was from Latinized word of Greek katalysis. The word "katalysis" which was composed of "katalyein" meaning "to dissolve," where "kata" means "completely," and "lyein" means "cut apart" (Online etymology dictionary).

How does a Catalyst Work?

Basically, a catalyst, a special substance, gets into starting materials, so-called reactants. As a reaction progresses, a catalyst induces starting materials to combine and create a new product, as shown in Figure 1. On the other hand, the catalyst itself is ultimately regenerated and not consumed; that is, the catalyst remains unchanged.

Figure 1

The Brief Mechanism of How Catalysts Work (Munyebvu,2018)

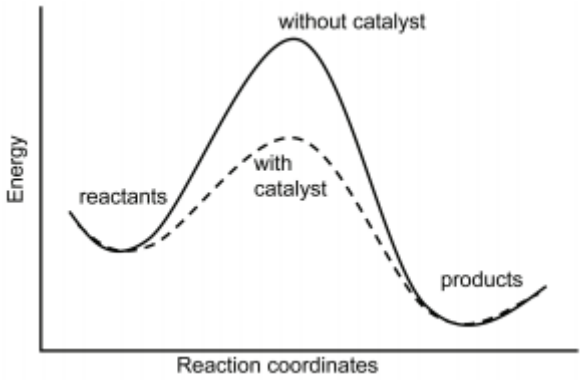


How is a Catalyst Efficient?

For more understanding of the principle of a catalyst, energy profiles with and without a catalyst are shown in Figure 2. Adding a catalyst in reactants requires lower energy to make a chemical reaction occur, compared to applying no catalyst in reactants; That is, applying a catalyst in reactants proceeds chemical reaction faster.

Figure 2

Energy Profile with and without Catalysts (Tuckerman & Kaiser, 2020)

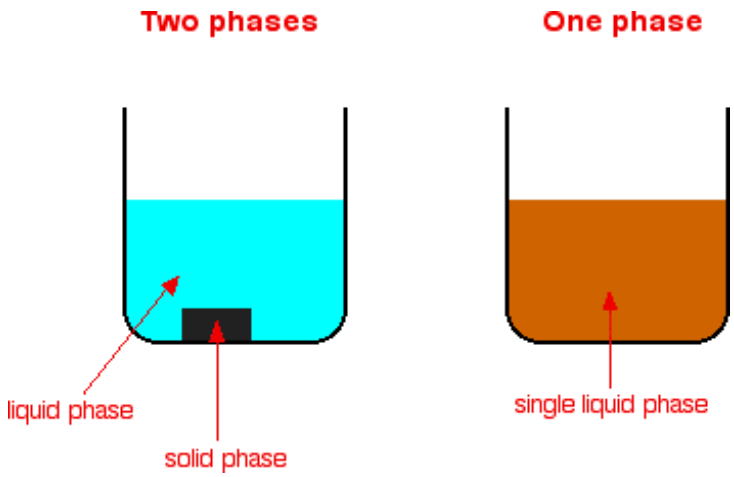


What Are the Different Types of Catalyst?

There are two main types of catalyst: a heterogeneous catalyst and a homogeneous catalyst. A heterogeneous catalyst is the one which exists in the different phase of the reactant. For example, in the left picture of Figure 3, the reactant is in a liquid phase, but the catalyst is in a solid phase. In contrast, a catalyst acts in the same phase as the reactant in the right picture of Figure 3; both the reactant and the catalyst are in a liquid phase (Clark, 2020).

Figure 3

The Conditions of Heterogeneous Catalyst and Homogeneous Catalyst (Clark, 2020)



What Are the Applications of Catalysts?

As mentioned above, there are two types of catalysts: a heterogeneous catalyst and a homogeneous catalyst. As an example, a heterogeneous catalyst produces ammonia which acts as fertilizer, refrigerant gas, water purifier and the manufacturer of plastics and pesticides. Hence, a heterogeneous catalyst is beneficial for human life. The other type, a homogeneous catalyst, for example, is used to destruct atmospheric ozone. Ozone damages lungs and worsens chronic respiratory disease like asthma. Even though only small amount of ozone is inhaled, its effects are significant, causing chest pain, cough, throat irritation and shortness of breath. Therefore, destructing atmospheric ozone leads to better human life.

In addition to these two examples, producing ammonia and destructing atmospheric ozone, catalysts are currently utilized in food industry, pharmaceutical industry, textiles, detergents, fine and special chemicals, paper, polymers, and cosmetics (Hauer, 2020).

Scientists have been working on the uses of catalysts continuously, which will improve the existing processes of catalysis and develop the new ones. More specifically, water splitting is highlighted as the future application; water splitting is the chemical reaction, which produces oxygen and hydrogen fuel cells from water. In addition, researchers have been seeking the catalysis of producing alcohol and hydrocarbons from carbon dioxide and water; hydrocarbon is a base of crude oil, coal and important energy sources. These future applications protect the environment more. Hopefully, researchers can make human life quality stronger by using the catalytic processes (Ball,2015).

I hope the readers could enjoy understanding the term “catalyst.” Hopefully, they will be able to use or realize this term hereafter.

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