



Enhancement of Catalytic Properties Involved in Chemical Production of Organic Compounds

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DESCRIPTION

The catalyst at which different physical phase from the reactants is termed as "Heterogeneous Catalysis," such reaction are those in which the reactants are in the gas phase while the catalyst is a solid the process is called "Contact Catalysis." The reactant molecules diffuse to the surface of the catalyst and get adsorbed on it. An intermediate is formed in between the adsorbed state which involves in less activation energy than that of uncatalysed reaction.

The catalysts are known as performance chemicals that enhance the processing of other chemicals. In the production of different types of catalysts, the units are versatile. The catalysts is a continues process and given priority for the chemical industry as it pursues to run the processes at a low temperature and as close by the atmospheric pressure as possible, for proportionate reasonable rate of reaction.

Use of hydrogen and carbon monoxide, is the well-known synthesis of gas or syngas, that produces value-added products including, but not limited to, liquid fuels, hydrocarbons, and oxygenates. The catalytic processes for syngas production from the various hydrocarbons, natural gas, and biomass are in mature stages both in academia and industry; however, there is an important aspect which needs to be addressed. In addition, major challenges are involved in other emerging energy applications, such as discovery of efficient biomass conversion catalysts and for CO conversion into liquid fuels and products. Working towards an energy-efficient zero-waste economy, the advanced processes and new material requirements are existing in order to facilitate a new generation of chemical and energy conversion catalytic systems.

Hetero and homo catalysis in chemical industry

Catalysis enables the chemical industry in all forms, from refineries to pharmaceuticals, from fossil fuels to biomass and it is regularly stated that over 90% of all chemical products have

at least one catalytic step in their manufacture. As Heterogeneous catalysts play an important role in industrial chemical production. They are preferred due to their robustness and lower operational cost, at which they are particular through easier recovery/separation from the products allowing chemical processes to be streamlined.

They are used in a large scale which involves in the production of organic and inorganic chemicals; crude oil refining and petrochemistry; environmental protection; and energy conversion processes. The ammonia synthesis from nitrogen and hydrogen is one of the most important processes in the chemical industry. With increasing in the crude oil prices, there is a growing trend towards the renewable raw materials. The heterogeneously catalyzed gas-phase oxidations of unsaturated hydrocarbons are involved in large-scale industrial processes. Selective catalytic oxidation processes are used for functionalizing hydrocarbon molecules. The use of catalysis, including bio-catalysis, in the fine chemicals industry has already resulted in much improved efficiency, but further progress is possible and needed.

An example, in heterogeneous catalysis, the oxidation of carbon monoxide to carbon dioxide over palladium is a very important process in everyday life. Motor vehicles are fitted with catalytic converters. They contains metal casing in which involved in two metals, palladium and rhodium, dispersed very finely on the surface of a ceramic support that resembles the honeycomb of holes. The converter is placed in between the engine and the outlet of the exhaust pipe.

Homogeneous catalysts are less frequently used in industry than heterogeneous catalysts because on completion of the reaction, they have to be separated from the products, and the process can be very expensive. The object is to find an organometallic complex which is present in small amount, and in trace elements they are involved in the conversion of given reagent into a desired product. The catalysis of chemical reactions using in bimetallic molecular compounds has continues attraction at considerable interest.

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CONCLUSION

The catalysis has always been an important tool for creating more sustainable processes. More recently, we saw the

importance of catalysis which plays a key role in the biomass conversion of fuels and chemistry. As interest in chemicals is based upon the renewable resources which is rapidly rising throughout the entire chemical industry.