Catalysis is the ability of some species to rapidly speed up the rate at which a chemical reaction proceeds. For historical reasons, the discipline is normally split into two categories; homogeneous and heterogeneous. Homogeneous catalysis is concerned with catalysts that are in the same phase as the chemical reactions they are speeding up. These reactions are normally in the liquid phase and include all of biology's enzymes. While the majority of homogeneous catalysis is in the liquid phase, there are gas phase and solid phase homogeneous catalytic reactions. Heterogeneous catalysts have a catalyst that is in a different phase. This type of catalysis is responsible for the vast majority of 'bulk' chemicals that are produced each year that go into making all the things we take for granted around us such as plastics, and are also extensively used for refining oil in gasoline. This chapter focuses on heterogeneous catalysis and specifically how and why they work at all.
The Effect of a Catalyst on Rate of Reaction

**Catalysts**

**Examples**

**Catalyst Examples**

*Thumbnail: Generic potential energy diagram showing the effect of a catalyst in a hypothetical exothermic chemical reaction $X + Y$ to give $Z$. The presence of the catalyst opens a different reaction pathway (shown in red) with a lower activation energy. The final result and the overall thermodynamics are the same. Image used with permission (Public Domain; Smokefoot).*