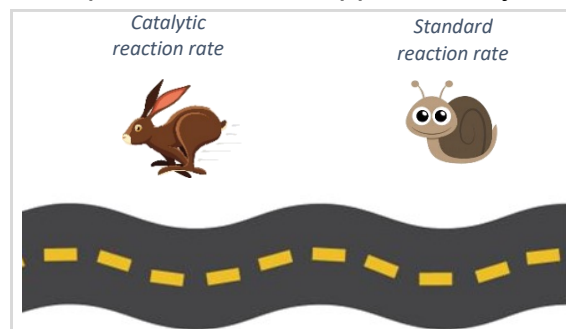


## COBALT CATALYZED HYDROGENATION OF ALKENES AND ALKYNES

Catalysis is a process of changing a chemical reaction pathway. This modification often lowers the reaction time and allows changes in the process conditions from harsh to milder. Because of these facts, almost all industrial processes have applied catalysis.

Hydrogenation, which is the subject of the project, is a process used in petrochemical, food and drug industries. Simple addition of hydrogen to an organic molecule, a seemingly easy transformation, can affect the 3D-structure of a compound, which is often connected to changes in its properties.



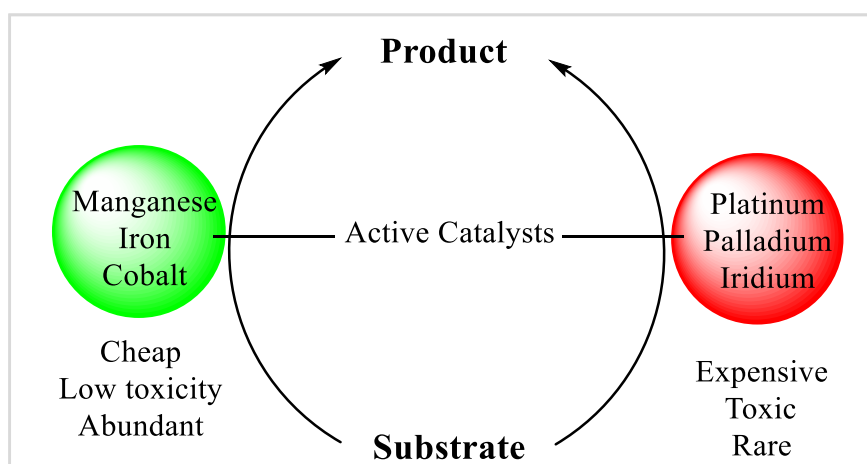
Comparison between catalytic and non-catalytic reaction rates.

Hydrogenation catalysts consist of a metal atom, and an associated organic compound.

Unfortunately, most of them employ toxic and expensive noble metals, like platinum or palladium. Continuously increasing prices of these metals, as well as problems with recycling of the catalysts based on them, have stimulated interest in catalysts based on more abundant, and therefore cheaper metals. On the other hand, abundant metals rarely compete with scarce ones in terms of activity. In this case, modification of associated organic compounds can play a crucial role in the process efficiency. Development of new, simpler catalysts paves the way to sustainable chemistry, by minimizing cost of reagents, waste generation and energy saving.

The project is aimed at developing new catalytic systems for hydrogenation reactions. New catalysts will be based on the abundant metal – cobalt, and on simple organic molecules.

This approach constitutes an alternative to commonly used expensive compounds. Greener and more sustainable chemistry is almost at hand. Now it is the time to take it!



Sustainable catalysis (green) versus classic catalysis (red).