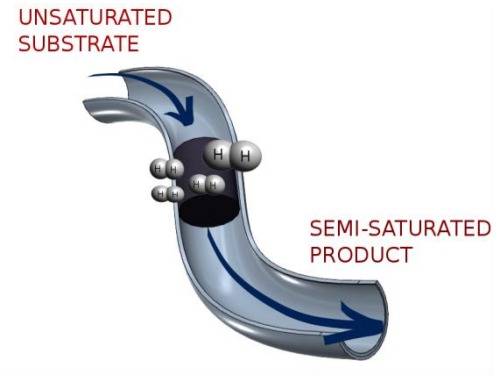
DESCRIPTION FOR THE GENERAL PUBLIC

The focus of catalysis research is on achieving 100% selectivity for the desired product. It is especially important in the **synthesis of medicines and vitamins**. These processes often require sharp chemical transformations, suppressing side paths while being selective to particular functional groups in multi-functionalized molecules. This principle shall also apply to catalytic hydrogenation which is very important methodology used in production of fine and pharmaceutical intermediates. Therefore, the development of cost-effective, well-defined, efficient and environmentally friendly catalytic systems for the hydrogenation reaction is very important aspect for sustainable development.



The main goal of the proposed project is to create a fundamental basis for the synthesis of the novel and readily available nano-catalysts for the **production of pharmaceutical intermediates** (medicines and vitamins precursors) **in flow conditions**.

The research strategy focuses on **the development of 3d transition metals (Co, Cu, Fe)** supported on active carbons, beta zeolites, polymeric resins, and hydrotalcite - active **in continuous-flow hydrogenation of the precursors of relevance to the fine and pharmaceutical industries.** Our research will be focused on chemoselective hydrogenation **of 2-methyl-3-butyn-2-ol** towards an important intermediate (2-methyl-3-buten-2-ol) for **the industrial synthesis of vitamins (A, E**), as well as a variety perfumes , and chemoselective hydrogenation of **2-methyl-2-pentenal towards 2-methylpentanal** - an important **intermediate for dyes, resins and drugs**. Additionally, we will concentrate on the hydrogenation of **2-butyne-1,4-diol into cis-2-butene-1,4-diol** an important intermediate in the **synthesis of antibiotics, vitamins A and B6, several insecticides and antitumoral chemicals** . Subsequently the enantioselective hydrogenation of **1-phenyl-1,2-propanedione** into **(R)-1-hydroxy-1-phenyl-2-propanone** - an **important intermediate in pharmaceutical synthesis**, particularly in the **production of ephedrine derivatives** will be carried out.

The planned research will allow to create a relationship between the structure of catalysts and their reactivity in this process. Because **the implementation of continuous-flow practices in the pharmaceutical industry is considered one of the most strategic fields of innovation toward greener manufacturing methods**, therefore, the development of new catalytic system based on transition metals which are active in this mode seems to be fully justified.