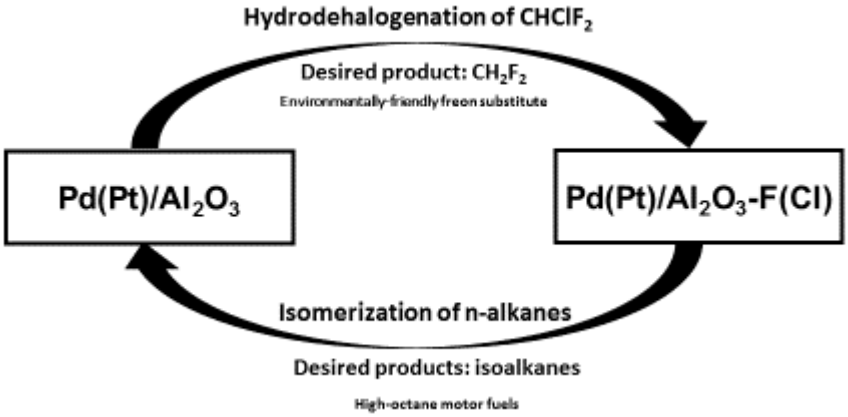
Absorbing dangerous to humans, animals and plants of ultraviolet radiation by the ozone layer is essential for life on Earth. Unfortunately, for nearly 30 years there has been a significant depletion of ozone layer destructed by such substances as chlorofluorocarbons (compounds of carbon, chlorine and fluorine), which for decades have been successfully used for example as cooling media in fridges. Freon R22 is a compound with the formula $CHClF_2$, which for a time can be used as a replacement for the dangerous freon R12 (CCl_2F_2) is now also being phased out of use. Despite the phasing out of these substances, stocked large quantities of this substance must be effectively recycled. In addition, participation of this freon in the industrial manufacture of Teflon^{TM} involves a real risk of its emissions to the atmosphere. Due to the negative impact of freon R22 on the durability of the ozone layer, the waste R22 neutralization is important for the protection of the atmosphere. However, it is still more useful to convert freons into other valuable, environmentally friendly products such as CH_2F_2, environmentally-friendly replacement for freons. We propose search for such catalyst which is capable of effective removal of chlorine in the presence of hydrogen.

The second process of what we deal with is the catalytic conversion of saturated hydrocarbons, like n-hexane. Transformation of linear alkanes to their branched isomers contributes to improve the properties of hydrocarbons as components of motor fuels. Antiknock properties of gasoline, rated by so-called octane number, are very detrimental to the petrol fraction obtained from oil distillation.

Why we propose in this draft to study two seemingly different reactions? Well, the essence of the project is not only search for effective catalysts (containing palladium and/or platinum) for both processes but also a cyclic combination of these two reactions:



In the first phase of the study we shall synthesize the catalysts containing palladium and/or platinum in the form of metal nanoparticles supported on the surface of aluminum oxide and test them in the reaction of freon R22 with hydrogen. It is expected that apart from achieving high degree of R22 transformation into CH_2F_2 (desired product) we shall also be able, by means of liberated HF/HCl, to shape the surface of catalyst active in the next reaction – isomerization of linear alkanes into their branched isomers.