Green chemistry is based on the concept of designing and performing chemical processes in such a way as to limit the use and formation of harmful substances. This concept is based on twelve principles, including the necessity to use raw materials from renewable sources with the application of catalytic processes (the most selective catalysts possible) to obtain products important for chemical industry.

Carbon dioxide (CO_2) and methane (CH_4) are the main gases contributing to the greenhouse effect. Chemical recycling, i.e. the conversion of CO_2 and CH_4 to methanol, dimethyl ether and / or acetic acid, makes them a source of the so-called green chemicals.

The project focuses on obtaining and describing the properties of metal ion centers that offer the highest catalytic activity in the transformation of CO_2 and CH_4 to methanol and dimethyl ether and are located in * BEA zeolites with tuned number and location of aluminum atoms.

Defining the process mechanism, in the context of the cooperative role of the redox and acid-base functions, will be crucial for the design of catalysts with the desired nature of the centres, their dispersion and, above all, their location, therefore the factors determining the effective low-temperature and, above all, selective production of precursors of critical chemical compounds (methanol and dimethyl ether) from raw materials with a high impact to the greenhouse effect.