Chloromethanes are used as important intermediates in the production of pharmaceuticals, agrochemicals, refrigerants, silicone polymers and fluoropolymers, and are crucial raw materials for the construction and automotive industries, water treatment, cookware, and electronics. However, chloromethanes, a group of volatile organic compounds, will cause serious problems such as stratospheric ozone depletion and global warming when released into the environment. Catalytic hydrodechlorination, an effective treatment to remove chlorinated pollutants, can operate at moderate conditions for the upgrading of chloromethanes to valuable products.

This project aims at developing a novel, selective and stable catalytic solid, which enables selective conversion of undesired chlorinated products into value-added chemicals. Next to the search for a viable and stable catalyst composition, we will design and employ a lab-scale reactor to properly conduct this process and define the reaction conditions to tune the selectivity of hydrodechlorination process. Moreover, *operando* spectroscopic techniques will be employed to track the physicochemical changes of the solid catalyst during the reaction. Overall, the aim is to improve the catalytic efficiency, reuse the undesired products, generate the desired compounds, minimize energy for the separation process, lower the carbon footprint, and have positive impacts on environmental sustainability.