

SHORT ABSTRACT

This thesis is aimed to find a solution for one of the environmental problems *viz.* increasing CO₂ concentration in the atmosphere. The thesis focuses over this subject for the mitigation of CO₂ through its utilization. Direct electrochemical reduction of gaseous CO₂ (dERC) has been found to be a suitable technology which not only helps in the utilization of the CO₂, but at the same time produce such reaction products which have the high calorific value. Thus, these reaction products can be used as fuels, which will also help to combat the problem of decreasing fossil fuel reserves. With this aim, the CO₂ is electrocatalytically reduced and converted into a variety of products. For screening the suitable electrocatalysts from the group of many, a catalytic activity protocol has also been developed to make the dERC process quick and easy. For the conversion of CO₂, different types of electrocatalysts; such as metals, metal oxides, metal complexes, and bimetal, have been developed and successfully used for the electrochemical CO₂ reduction and formation of value added products.

Keywords: Bimetal, Catalytic activity protocol; Electrocatalysts; Direct electrochemical reduction of CO₂; Metal oxides; Salen metal complexes