**Surface Chemistry of Ruthenium Dioxide in Heterogeneous Catalysis and Electrocatalysis: Case Study HCl-Oxidation**

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In this talk I will be comparing our current understanding of the electro-catalyzed chlorine evolution reaction (CER) with that of the heterogeneously-catalyzed gas phase oxidation of HCl (so-called Deacon process: heterogeneous catalysis) over RuO2-based catalysts. Both types of harsh reactions are chemically similar: The main concern is catalyst stability, and in both cases the best catalyst contains RuO2 as the catalytically active component so that a critical comparison may provide new insights into the underlying physicochemical processes. It is the primary scope of this talk to focus on atomic scale information on the RuO2-catalyzed HCl oxidation reaction either in electrochemical or in gas phase environment. In particular, the involved reaction mechanisms and the reason for the stability of RuO2 under such harsh reaction conditions will be discussed, emphasizing similarities and differences in the Deacon process and the CER and what can be learnt from this comparison. The distinct properties of RuO2, which are responsible for its extraordinary catalytic performance in both the CER and the Deacon process, are highlighted.