Progress on the mechanistic understanding of SO2 oxidation catalysts - DTU Orbit (17/11/2019)

Progress on the mechanistic understanding of SO\textsubscript{2} oxidation catalysts
For almost a century vanadium oxide based catalysts have been the dominant materials in industrial processes for sulfuric acid production. A vast body of information leading to fundamental knowledge on the catalytic process was obtained by Academician [G.K. Boreskov, Catalysis in Sulphuric Acid Production, Goskhimizdat (in Russian), Moscow, 1954, p. 348]. In recent years these catalysts have also been used to clean flue gases and other SO\textsubscript{2} containing, industrial off-gases. In spite of the importance and long utilization of these industrial processes, the catalytic active species and the reaction mechanism have been virtually unknown until recent years.

It is now recognized that the working catalyst is well described by the molten salt/gas system M\textsubscript{2}S\textsubscript{2}O\textsubscript{7}-MHSO\textsubscript{4}-V\textsubscript{2}O\textsubscript{5}/SO\textsubscript{2}-O-2-SO\textsubscript{3}-H\textsubscript{2}O-CO\textsubscript{2}-N-2 (M=Na, K, Cs) at 400-600 degrees C and that vanadium complexes play a key role in the catalytic reaction mechanism.

A multiinstrumental investigation that combine the efforts of four groups from four different countries has been carried out on the model system as well as on working industrial catalysts. Detailed information has been obtained on the complex and on the redox chemistry of vanadium. Based on this, a deeper understanding of the reaction mechanism has been achieved. (C) 1999 Elsevier Science B.V. All rights reserved.

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