

Editorial Note on Interfacial Coordination Chemistry for Catalyst Preparation Sai Srinivas Akkina

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EDITORIAL NOTE

During his time as a full professor at the University Pierre et Marie Curie, Michel Che made a name for himself by introducing the principle of interfacial coordination chemistry. Isolated metal ions on oxide surfaces act like coordination compounds, with the surface contributing hydroxyl groups as well as neutral oxo bridges. Since the latter is pH sensitive, it can be charged positively or negatively, allowing for selective adsorption of transition metal ions with opposite charges. In the early 1980s, there were few examples of using these properties to prepare oxide/metal assisted catalysts. Michel Che designed, produced, and promoted the principle of interfacial coordination chemistry, which is now commonly used in the field of heterogeneous catalysis, based on his early studies, mostly on molybdenum and nickel ions. This allowed him and his close collaborators to gain a molecular-scale understanding of a variety of catalyst preparation procedures, including impregnation. Interfacial Coordination Chemistry's effect and legacy on the existing design of improved catalytic formulations are also addressed. Chemistry occurs at the interface between two phases in the preparation of heterogeneous catalysts, the most common of which are the liquid-solid and gas-solid interfaces. It's difficult to believe how little was understood about this chemistry when Michel Che began his scientific career as a full professor at the University Pierre et Marie Curie more than four decades ago. at a time when heterogeneous catalysis papers were mainly focused on kinetics and physical characterizations, with ideas like Michel Boudart's "demanding reactions" . Coordination, supramolecular, and solid state chemistry, on the other hand, was already thriving fields in which atomic or molecular structure-property correlations were a necessity for publication. Vansant and Lunsford identified the emblematic reaction of single electron oxidation by dioxygen of the $[\text{Co}(\text{NH}_3)_6]^{2+}$ ion exchanged in Y zeolite, leading to the $[\text{Co}(\text{NH}_3)_n(\text{O}_2^-)]^{2+}$ superoxo complex $[\text{Co}(\text{NH}_3)_n(\text{O}_2^-)]^{2+}$ superoxo complex. To our knowledge, this is one of the first articles on catalyst architecture to make use of the coordination chemistry principle of "Crystal Field Theory". Burwell et al., using the coordination chemistry principle of "crystal field theory," published a paper on cobalt adsorbed on silica in the 1960s. The "SiOH and SiO-" writings for surface silanol and silanolate entities entering the coordination domain of cobalt as ligands were proposed in this paper. It should be remembered that simultaneous innovations occurred at the same time. With a clear background in EPR applied to transition metal ions (TMI), Michel Che naturally developed an interest in the explanation of the chemistry of supported metal ions at the molecular level, concentrating first on $S = 1/2$ ions, Mo^{5+} (d^1) as a defect in bulk oxides or supported on oxides, and finally on $S = 1/2$ ions, Mo^{5+} (d^1) as a defect in bulk oxides or supported on oxides. In the mid-eighties, he published his first mini-reviews on TMI coordination chemistry, which were based on the use of EPR.