Supported Metals in Catalysis

2nd Edition

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2nd Edition

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PREFACE TO THE FIRST EDITION

The quantity of information available on a subject so apparently restricted as ‘Supported Metal Catalysts’ is such that no single mind can fully comprehend it all. We must therefore welcome every effort that is made to reduce it to manageable proportions and to present it to us in a readily digestible form. The problems that I have encountered when faced with a similar task have been to discriminate between the important and the not so important, and then to order the former in as logical a fashion as possible. I cannot claim always to have succeeded, but at least I recognise some of the qualities that are needed, even if I do not possess them myself to the extent I would wish. Long experience in the field is one, and a fair helping of that valuable commodity ‘wisdom’, which was once defined as ‘knowing where to find knowledge’.

When I started research in 1948 there was obviously much less known about everything and about supported catalysts in particular. To quote a recent authority, there were things we didn’t know we didn’t know. Life was simpler then, and it has become progressively more complicated as tools have become available to extend our knowledge of the materials we use. But as J.W. von Goethe put it succinctly: *We know accurately only when we know little; with knowledge, doubt increases.* More optimistically, however, Francis Bacon, Lord Verulam, believed that *If a man begin with certainties, he shall end in doubts; but if he will be content to begin with doubts, he shall end in certainties.*

The scientific method is a kind of perpetual motion machine in which our doubts and uncertainties stimulate us to continued effort to resolve them in the hope that we may come to at least a few certainties. For this we need the guidance of the wise who are prepared

to invest their time and energy to create a book such as this. It deals with the preparation, characterisation and use of supported metal catalyst in vitally important areas, as well as informing us of theoretical developments. An overview such as this will be of tremendous value to all who work or are thinking to work in this field.

So what is the criterion by which 'wisdom' should be judged? Many years ago I read the following advice, which in my view encapsulates a good deal of common sense.

He who knows not, and knows not he knows not, he is a fool: leave him.

He who knows not, and knows he knows not, he is willing: teach him.

He who knows, and knows not he knows, he is asleep: wake him.

He who knows, and knows he knows, he is wise: follow him.

If you wish to be better informed about supported metal catalysts, read the following chapters, written by people who know that they know.

Geoff Bond

PREFACE TO THE SECOND EDITION

It seems appropriate that I should find myself writing the preface during a journey between Madrid and Aberdeen given that the second edition of *Supported Metals in Catalysis* once again draws heavily from contributors with Spanish and Celtic connections (apologies Guido, perhaps there is something in your ancestry?). I am hugely grateful for the time and effort that all contributors have committed to providing these chapters and hope they are well received by readers. When we were initially asked to write and edit the first edition, it was not envisaged that the full print run would go on to sell out (or that it would appear on Amazon's list of bestsellers in catalysis listings) and so there were no thoughts at that stage of how we would deal with a second edition. Circumstances therefore have allowed us to review, revise and update the contents to provide this second edition. We have omitted some of the chapters which appeared in the first edition where, in cases, the topics dealt with more established uses of supported metals and where developments in the field over the last five years were limited and where additional literature on the subject was minimal. This has allowed us to include new chapters where we have looked at emerging and fast-developing fields where supported metals will play a role. We are grateful to Sergio Rojas and colleagues for providing the chapter on application of supported metals for fuel cell applications and to Jose Rodriguez who provides an insight into some of the many reactions for which gold catalysts are currently receiving attention. Similarly, it was felt that the continuing advances made in our understanding of supported metal particle-based catalysts, as a result of technical advances in electron microscopy including the use of aberration

correcting devices, warranted a chapter of its own rather than appearing as a subsection of a chapter on determination of particle size. I thank Andy Herzing and Chris Kiely for contributing this chapter and hope they forgive me for all of the harassing which I gave them in trying to meet the publisher's deadlines. All of the other chapters have been thoroughly revised and will hopefully provide the reader with a route to access literature published on these topics up to 2010.

Lastly it was an enormous pleasure to have been able to have a preface to the first edition written by Geoff Bond who has made and continues to make such huge contributions to the field of supported metal catalysis. It has been a privilege over the years to attend and contribute to the UK RSC SURCAT group meetings at which Geoff participated, and I often aspire to be able to contribute to the field of supported metal catalysis to the extent which he has. Alas, however, I do not aspire to write such beautiful prose as Geoff and therefore ask forgiveness of those who purchase the second edition and consequently find an inferior preface. I do hope however that the standard of the proceeding chapters more than compensate.

Jim Anderson
February 2011