

## Book review

J.W. NIEMANTSVERDRIET

*Spectroscopy in Catalysis: An Introduction*

VCH, Weinheim 1993, VIII, 288 pp., hard-cover, DM 148, ISBN 3-527-28593-9

“Both textbook and monograph”, this admirable volume gives an up-to-date account of surface techniques and recent examples of their application to elucidating details of surface structure and their role in catalysis.

Chapters on electron spectroscopies, ion spectroscopies, Mössbauer spectroscopy and vibrational spectroscopies as well as a section on EXAFS are augmented by others on thermal desorption, diffraction and microscopy. Sufficient practical detail is included to give a feel for the utility of the techniques superior to that obtained from descriptions in recent texts on the chemistry of catalytic processes. In addition, key equations are given for most of the techniques that help quantify the processes. By combining this level of technique description with illustrations of applications to catalyst preparation and activation, measurement of surface composition and texture, and catalyst–support interactions the author puts together, in a concise form, a text that is both complementary to books on surface and catalytic chemistry and which leads naturally to more detailed accounts of the many techniques described in carefully chosen references.

The chapters on spectroscopy are perhaps the most useful, particularly those on electron spectroscopy, ion spectroscopy, Mössbauer and EXAFS. But more could have been made of vibrational spectroscopy and electron microscopy, not to mention NMR, ESR and XANES, which are completely absent. In the Preface, Dr. Niemantsverdriet describes his title “Spectroscopy in Catalysis” as “not quite precise”. Indeed, “Characterisation of Catalytic Surfaces” would be more accurate, especially when most of the techniques give information about the surface rather than the catalyst–reactant chemistry. Almost no mention is made of spectroscopy of adsorbed reactants, of acid catalysts or of zeolites.

The usual difficulty of relating surface structure measured under UHV to catalyst systems operating at high pressures and temperatures is discussed, and the use of Mössbauer, EXAFS and XRD, under in situ conditions is well illustrated. In particular, in a chapter devoted to specific case studies, the characterisation of the hydrosulphurisation catalyst CoMoS in atomic detail is undertaken by a combination of approaches including EXAFS and Mössbauer.

In summary, this is a very worthy supplement to texts on catalytic chemistry in its concise description of techniques of characterisation and their applicability to surfaces of supported metal and related catalysts. This single author style maintains a degree of continuity not obtained in collections of contributed articles. But it does to some degree limit the scope rather more than the title suggests.

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