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Introduction

Transmission electron microscopy has been extensively used in the past by the catalyst community to measure the size of the particles (or the dispersion) of active phases. This was generally performed on a replica of the real surface by evaporating a thin film of carbon followed by the dissolution of the support (alumina, silica, etc. ...) and sometimes of the active phase itself, in this latter case only the holes left by the active phase on the carbon film were measured. This technique had to be used to maintain the integrity of the catalytic surface because it was often impossible to have small enough grains of catalyst to allow electron transmission. Only in very easy cases was it possible to avoid the use of a replica and to analyse the sample directly. Access to the dispersion is of the greatest importance as it provides the relative number of surface atoms, and catalysis is mainly a surface phenomenon.

But this technique was generally limited by the resolution of the apparatus ($\cong$ 5 Å at best).

The improvement in resolution of the new generation of microscopes working in the high resolution mode (HRTEM) and the higher energy of the electron beam have permitted these problems to be solved. Because of the fantastic resolution (in the range of 1 to 2 Å) it is now possible to use the microscope to analyse the fine structure of the catalyst. The six papers which make up this volume illustrate what can now be achieved. The first article (Yacaman et al.) introduces the technique, its present limitations and its future prospects. The following four articles (Terasaki and Ohsuna, Bernal et al., Delporte et al., and Chianelli et al.) show the applications of HRTEM to different families of catalytic materials, respectively zeolites, metals, carbides and sulfides. It is important to underline, as is also emphasized in the first article, that HRTEM should be used in conjunction with other techniques in order to be most profitable to catalytic material science. For instance, Delporte et al. have combined HRTEM with SEM, XPS, XRD, electron microdiffraction and BET adsorption to give the first description of a very complex new catalytic material, the oxicarbide of molybdenum.

Finally, the last article deals with the catalysts used in a specific field, closely involved in environmental protection, the automotive exhaust pipe catalyst. Benaissa et al. analyse a new generation of silicon carbide supported Pt/Rh catalysts.

It is not possible to conclude this short introduction without thanking the authors, not only for their contributions to this volume but also for having provided readers with a unique opportunity to 'see', almost atomically, the materials on which they are working. The beauty of nature is revealed (sometimes with a helping hand from man!) by the numerous pictures reproduced here (thanks to the editor) and I hope that they will convince the last sceptics that science is still, very often, pretty close to art.

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