



Molecular Crystals and Liquid Crystals

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Book review

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BOOK REVIEW

An Introduction to Surface Analysis by XPS and AES, by John F. Watts and John Wolstenholme, John Wiley & Sons Ltd., 2003; xi + 212 pp; \$52.50, paper; \$130.00, cloth.

At first glance, this book appears to be yet another introduction to photoelectron spectroscopy intended for users new to the technique. However, closer examination shows it to be full of information that is valuable even to experts. The first chapter contains the usual type of introduction to the basic concepts of X-ray photoelectron and Auger electron spectroscopies, including depth of analysis and a comparison of the two techniques. The second and third chapters, which deal with electron spectrometer design/operation and interpretation of spectra, are what make this book particularly unique and valuable. Useful topics include a comparison of different types of energy analyzers and modes of operation (i.e., constant analyzer energy versus constant retard ratio), a discussion of small area XPS, information related to X-ray monochromators, and an extensive discussion of chemical state information obtainable from photoelectron spectroscopy. Some of the details provided in these two chapters are not easily found in other references. I was delighted, for example, to see a thorough discussion of the function of the transfer lens used in a concentric hemispherical analyzer and a comparison of XPS survey spectra taken under identical conditions except for different modes of operation.

Chapter four covers depth profiling via angle-resolved XPS measurements and noble gas sputtering. Specific topics include sputtering yields, factors affecting depth resolution, and the design of ion guns. The fifth chapter attempts to cover representative examples of the use of these techniques in materials science. Topics related to corrosion, tribology, catalysis, ceramics, semiconductors, and polymers are given. The discussion includes a number of useful figures, and the examples chosen adequately demonstrate the power of XPS and Auger for tackling a variety of important problems. Again, even for the experienced user of these techniques, this chapter is useful to have as a reference. The sixth chapter is relatively short and compares XPS and Auger to other surface analytical techniques, including secondary ion mass spectrometry, electron microscopy, and ion scattering.

Watts is a professor at the University of Surrey (UK) and the editor-in-chief of the journal *Surface and Interface Analysis*. His thorough knowledge of the field is evident in the well-chosen examples used to illustrate the scientific problems that can be solved with XPS and Auger. Wolstenholme is a marketing manager with Thermo VG Scientific, one of the leading manufacturers of photoelectron spectrometers. As a user of VG Scientific equipment, I found this book, and particularly chapters two and three, quite valuable as a succinct summary of the operating principles of their ESCALAB instrumentation. It will be required reading for my students. It summarizes in one volume what is either not included or is very difficult to find in the manuals that come with the equipment. However, it would similarly be valuable to users of equipment made by other manufacturers. This book is highly recommended as an excellent, easily readable summary of topics important to new and experienced users of XPS and Auger.

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