

## Editorial

### Report on: EMAS' 93 The 3rd European Workshop on: 'Modern Developments and Applications in Microbeam Analysis'

The 3rd Workshop of EMAS – The European Microbeam Analysis Society – took place in Rimini, Italy in the period 9th to 13th May 1993. The format was the one adopted in the previous events, having proved to be well received by the participants. Contributions are all in the form of a poster display for which plenty of time is provided. There is also sufficient time to visit the exhibition of microanalytical instrumentation. All the oral presentations are from invited speakers and an hour long. Following the oral presentation, the speaker and the chairman of the session are joined by one or two 'experts' to form a panel in a round table discussion.

At the meeting the attendees are given a questionnaire covering their opinions on the contents, time allocation and balance of the meeting. This is used for planning the next workshop – 'to try to give the customers what they need'.

Below is a synopsis of the tutorials given at the Rimini Workshop.

The opening lecture, entitled *Correction procedures in electron probe microanalysis of bulk samples* was delivered by one of the fathers of X-ray microanalysis, P. Duncumb from Cambridge University. He stressed that in the last years most of the advances in quantitative analysis stemmed from the improvement of physical models and their availability as a software for the computers. As a future perspective, Duncumb foresees that the computer itself will take the role of an *expert* capable of advising the analyst on the experimental procedures most suitable to obtain accurate analytical results.

A significant part of the Workshop was devoted to the so called *standardless analysis* techniques, which are most attractive for the users. J.L. Pouchou (ONERA, Paris) has treated the case of the bulk samples, stressing the problems related to the continuum fluorescence and the choice of the physical parameters, particularly in the case of the light elements. Moreover, he has discussed specific situations, of interest to the everyday practice, such as the analysis of inclined samples, multilayer specimens or specimens with a thin conductive coating. The standardless analysis of thin self-supporting films (i.e. the ones that are generally investigated in a TEM) was covered in the lecture of W.A.P. Nicholson (University of Glasgow); he has evidenced the importance of the choice of ionization cross sections, that are the fundamental basis of both the characteristic and the continuum X-ray production; he described a new version of the continuum normalization method for the quantitative analysis of samples with an organic matrix, which includes also the corrections for X-ray absorption and secondary fluorescence, that are necessary in the case of thick films.

An additional microanalytical technique, related to electron microscopy, is the electron energy loss spectrometry (EELS), which has been discussed by C. Colliex (Université Paris Sud). He described new methods of acquisition of different families of spectra on a large number of pixels from the sample being investigated (*spectrum images*) and their processing, through several examples from both the biomedical and the materials science so that the potential impact of EELS in the characterization of nm-sized structures was demonstrated.

The survey of the techniques based on the electron excitation was completed with the Auger spectrometry. The progress in the high spatial resolution (up to 10 nm) regime and in the quantita-

tive analysis of specimens containing elements in different states of chemical bonding was reported by S. Hofmann (Max-Planck Institut, Stuttgart), who also synoptically discussed the relationships between X-ray microanalysis and Auger spectrometry, with particular emphasis to their limitations and expected developments.

The continuing success of the so called environmental scanning electron microscopy (ESEM) suggested to our Society that we invite the originator of this technique, G.D. Danilatos (ESEM Research Lab., Sydney), to the Workshop. He has shown how ESEM incorporates all the functions of a conventional SEM (including X-ray microanalysis), but at the same time opens new possibilities of imaging of any kind of specimens, both wet and dry, insulating or conducting. The ESEM is characterized by the possibility of keeping a gas pressure in the specimen chamber, yet being able to use all the types of guns and detectors generally present in the conventional SEMs.

In this third edition of the EMAS Workshops, some other techniques, based on ion excitation and widely used in the analysis of thin films, have been considered. A.V. Drigo (University of Padova) has described the fundamental aspects and the applications of the techniques of Rutherford backscattering, ion channeling and nuclear reaction analysis; H.W. Werner (Technische Universität Wien) has reported on the quantitative analysis by secondary ion mass spectrometry (SIMS). Useful comparisons between the two techniques have been made both by the two speakers and by the participants to the subsequent round table. To this framework belongs also the talk by P. Van Espen (University of Antwerp), devoted to the field of particle analysis, performed not only by X-ray microanalysis, but also by other techniques, based on ion or laser excitations, as well as by synchrotron radiation.

Particular success has been attributed by the participants to the scientific exhibition, of which 17 companies contributed with SEMs, X-ray spectrometers, demonstration softwares and brochures.

The full text of the tutorials is published, along with the poster abstracts and these were distributed at the time of registration. The whole proceedings are due to be published in *Mikrochimica Acta*.

The next Workshop (EMAS'95) will be held at the Palais des Congres of Saint-Malo (France) from May 14 to 18, 1995. The conference Chairperson will be Danièle Benoit from IRSID (St. Germain-en-Laye), Vicepresident of the Society.

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