



**European
Microbeam Analysis Society**



EMAS 2016

12th EMAS Regional Workshop on

ELECTRON PROBE MICROANALYSIS OF MATERIALS TODAY - PRACTICAL ASPECTS

including a session on
Analysis on non-conducting materials

8 - 11 May 2016
CEA Marcoule, Bagnols-sur-Cèze, France

ANNOUNCEMENT AND PROVISIONAL PROGRAMME

Organized in collaboration with:

CEA - Centre de Marcoule
Institut de Chimie Séparative de Marcoule (ICSM)
Université de Montpellier

1. AIMS AND SCOPE

The EMAS Regional Workshops are biennial events designed to provide postgraduate-level and research workers in materials science, material engineering and related subjects, with basic knowledge of the capabilities and limitations of electron probe X-ray microanalysis. The workshops are organized as low-budget meetings with lectures on practical and theoretical aspects of EPMA given by internationally recognized experts. The format and content of the meetings are tailored to the needs of the practical microanalyst routinely dealing with problems of instrumental procedures, specimen preparation, data collection and quantification, as well as those of research workers keen to obtain a deeper understanding of the physics underlying X-ray production, measurement and analysis.

Past EMAS Regional Workshops were held in Finland (1994), Hungary (1996), Spain (1998), the Czech Republic (2000), Poland (2002), Slovenia (2004), Germany (2006), Italy (2008), the Netherlands (2010), Italy (2012), and Austria (2014).

The core topics of the 12th EMAS Regional Workshop are:

- Electron beam - specimen interactions
- X-ray spectroscopy (WDS and EDS)
- Light element analysis
- Quantitative electron probe microanalysis
- Analysis under low-vacuum conditions
- Sample preparation
- Electron backscatter diffraction (EBSD)

A special session entitled “*Analysis of non-conducting materials*” will be organized including two technical sessions dedicated to this subject. Topics covered in these two sessions will include:

Session on non-conventional methods:

- Analysis of coatings
- Analysis in the VP-SEM
- Combination of analytical techniques for geological materials analysis
- Comparison of μ -XRF and EDS
- Low-voltage analysis

Session on non-conventional materials:

- In situ experiments in the VP-SEM
 - Sample stability in the VP-SEM
 - Analysis of gunshot residues
 - Analysis of transuranium elements
 - Analysis of multi-phase materials
 - Instrument development
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2. SCIENTIFIC PROGRAMME

The programme will consist of invited lectures delivered by renowned experts, and two poster sessions. Three round-table discussions will also be held during the workshop. The invited lectures and poster abstracts will be published in the Workshop *Book of Tutorials and Abstracts*. The official language of the workshop will be English.

Preliminary programme

Sunday 8 May 2016

- 17h00 Registration (at “Le numéro 75”, rue Guillaume Puy 75, Avignon)
18h00 Welcome reception (at “Le numéro 75”)

Monday 9 May 2016

- 07h45 *Coach transfer from Parking Ferruce, Avignon*
08h00 *Coach transfer from Gare Centre, Avignon*

08h00 Registration

09h00 **Welcome and Opening Addresses**
- *Gilles Bordier*, CEA Marcoule Deputy Director
- *Olivier Dugne*, CEA Cadarache
- *Michael B. Matthews*, EMAS President

Session I

- 09h30 **Introduction to EPMA and SEM**, *Hans Dijkstra*, Thermo Fisher Scientific BV, Breda, The Netherlands
10h10 Coffee
10h40 **Sample preparation for EPMA (generic)**, *Silvia Richter*, R.W.T. H., Gemeinschaftslabor für Elektronenmikroskopie (GFE), Aachen, Germany
11h20 **Performance characteristics of EDS detectors**, *Michael B. Matthews*, AWE Plc., Aldermaston, Great Britain
12h00 Lunch
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Session II

- 13h30 **Performance characteristics of WDS detectors**, *Michael B. Matthews*, AWE Plc., Aldermaston, Great Britain
- 14h10 **Light element analysis**, *Hans Dijkstra*, Thermo Fisher Scientific BV, Breda, The Netherlands
- 14h50 **Quantification in EPMA**, *Xavier Llovet*, University of Barcelona, Centres Científics i Tecnològics (CCiT), Barcelona, Spain
- 15h30 Refreshment break / Poster Session I
- 16h00 **Introduction to EBSD**, *François Brisset*, Université Paris-Sud, Institut de Chimie Moléculaire et des Matériaux d'Orsay, Orsay, France
- 16h40 **Principles and practice of variable pressure imaging and microanalysis**, *Debbie Stokes*, FEI Company, Eindhoven, The Netherlands
- 17h20 Round-table discussion:
EPMA - EDS/WDS - Light element analysis - quantification - EBSD - Low vacuum analysis
Moderator: Emmanuelle Brackx, CEA Marcoule, Bagnols-sur-Cèze, France
- 18h30 End of session
Coach transfer to Avignon

Tuesday 10 May 2016

- 07h45 *Coach transfer from Parking Ferruce, Avignon*
- 08h00 *Coach transfer from Gare Centre, Avignon*

Session III

- 09h00 **From the physics of secondary electron emission to image contrast in scanning electron microscopy; a tribute to Jacques Cazaux**, *Christian Mathieu*, Université d'Artois, Laboratoire de Physico-chimie des Interfaces et Applications, Lens, France
- 09h30 **Mitigating charging in EPMA of non-conductive materials**, *Stuart L. Kearns*, University of Bristol, School of Earth Sciences, Bristol, Great Britain
- 10h00 Coffee
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- 10h30 **High spatial resolution imaging and X-ray microanalysis of non-conductive materials**, *Hendrix Demers*, McGill University, Department of Metals and Materials Engineering, Montréal, Québec, Canada
- 11h00 **μ -XRF compared to EDS of coated samples**, *Mathias Procop*, Berlin, Germany
- 11h30 **Application of microanalysis in the variable pressure SEM**, *Lahcen Khouchaf*, Ecole des Mines de Douai, Laboratoire d'Analyse Physique, Douai, France
- 12h00 Lunch
- 13h30 Commercial: 6x 15 min. presentations
- 15h00 Refreshment break / Poster Session II
- 15h30 **Combining analysis techniques for the characterisation of geological materials**, *Anne-Magali Seydoux-Guillaume*, Université Jean Monnet, Département de Géologie, Saint-Etienne, France
- 16h00 Round-table discussion:
Microbeam analysis using non-conventional methods
Moderator: François Brisset, Université Paris-Sud, Institut de Chimie Moléculaire et des Matériaux d'Orsay, Orsay, France
- 17h00 End of session
Coach transfer to Avignon
- 19h30 Workshop dinner at "Le numéro 75" (rue Guillaume Puy 75, Avignon)

Wednesday 11 May 2016

- 07h45 *Coach transfer from Parking Ferruce, Avignon*
- 08h00 *Coach transfer from Gare Centre, Avignon*

Session IV

- 09h00 **Applications of variable pressure SEM at high temperature**, *Renaud Podor*, Institut de Chimie Séparative de Marcoule, Bagnols-sur-Cèze, France
- 09h30 **Advances in gunshot residue analysis**, *Richard Wührer*, Western Sydney University, Advanced Materials Characterisation Facility, Penrith, NSW, Australia
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- 10h00 **Electron probe microanalyses of transuranium elements in insulating materials**, *Magaly Tribet*, CEA Centre de Marcoule, DTCD/SECM/LMPA, Bagnols-sur-Cèze, France
- 10h30 Coffee
- 11h00 **SEM advanced and recent analysis tools applied to cement and concrete microstructure: review of spectro-spatial strategies and cases of application**, *Samuel Meulenyzer*, LafargeHolcim, Centre de Recherche, Saint-Quentin-Fallavier, France
- 11h30 **SEM techniques for the bio- and organo-mineral interface characterisation in environmental science**, *Guillaume Wille*, Bureau des Recherches Géologiques et Minières, Orléans, France
- 12h00 Round-table discussion:
Microbeam analysis of non-conventional materials
Moderator: Olivier Dugne, CEA Cadarache, St. Paul lez Durance, France
- 12h45 Closing ceremony
- 13h00 *Coach transfer to Avignon (Gare TGV at 14h30 - Gare Centre at 14h45 - Parking Ferruce at 15h00)*

Posters presentations

All participants to the workshop are invited to make a poster presentation. Abstracts of poster contributions to be presented during the workshop should fit one A4 page; the Word-template is available on the EMAS website (www.microbeamanalysis.eu). Detailed guidelines are mentioned on the template. Online submission details are given on the workshop webpage.

The abstract, has to be submitted before 15 February 2016. Authors will be notified of the acceptance of their poster by 1 March 2016.

Proceedings

Authors of contributions related to the topic of the workshop's special session are invited to submit a manuscript for publication in an issue of the journal *Microscopy and Microanalysis*, to appear some months after the Workshop. All submitted papers will be peer-reviewed. Manuscripts will have to be submitted using the journal's on-line submission procedure.

EMAS Bursaries

A number of EMAS bursaries are available to **student members** of the Society. They include a free “student” registration and free accommodation package for the duration of the Workshop (in a shared twin room) in a hotel assigned by the Workshop. The conditions for the award of an EMAS bursary are as follows:

- the applicant must submit an abstract for a poster contribution;
- the applicant must be a student member of EMAS;
- a letter from the applicant’s supervisor supporting the application must accompany the application (see further).

A number of EMAS bursaries are available to **technician members** of the Society. They include a free “student” registration and free accommodation package for the duration of the Workshop (in a shared twin room) in a hotel assigned by the Workshop. The conditions for the award of an EMAS bursary are as follows:

- the applicant must submit an abstract for a poster contribution;
- the applicant must be a member of EMAS and <30 years of age at the time of application;
- a letter from the applicant’s supervisor/manager supporting the application must accompany the application (see further).

The quality and relevance of the work presented in the abstract are the main criteria on which successful applications will be judged. A maximum of 2 bursaries per person can be awarded.

Bursary applications must be sent to the Workshop Secretariat referring to the relevant poster contribution abstract, reaching it before 15 February 2016. Applicants will be notified of the allocation of an EMAS bursary by 1 March 2016.

3. REGISTRATION

Online registration is available on the EMAS website (www.microbeamanalysis.eu). Participants are encouraged to complete registration and arrange for their payment, preferably by 31 March 2016 to qualify for reduced rates.

Workshop registration fees

	Early registration (by 31 March)	Late registration (as of 1 April)
EMAS member	€ 350	€ 400
Non-member	€ 400	€ 450
Student (ID required)	€ 175	€ 200
EMAS Bursary	free	
Extra workshop dinner ticket	€ 50	
1-day ticket	€ 150	

The registration fee for respectively EMAS members, non-members, students and EMAS Bursary recipients, includes a copy of the workshop's *Book of Tutorials and Abstracts* (invited lectures manuscripts and poster abstracts), two lunches, and coffee/refreshment breaks during the workshop, the welcome reception (Sunday 8 May), and the workshop dinner (Tuesday 10 May), and coach transport from/to Avignon from Monday to Wednesday.

The 1-day ticket includes a copy of the workshop's *Book of Tutorials and Abstracts*, lunch and the coffee/refreshment breaks, and coach transport from/to Avignon on the day of attendance.

Payment

Payment of the registration fee should be preferentially made through the EMAS website (www.microbeamanalysis.eu) using the online PayPal system (no account necessary); no credit card information will be stored on the EMAS website; various payment options are available (e.g., credit cards) depending on your country. An invoice/receipt will be generated by the system.

Alternatively, if you prefer to pay by bank transfer or any other offline payment method, please choose the "pay offline" button and follow the instructions; this will generate your invoice, which includes bank transfer and contact details.

Cancellation policy

A refund of the registration fee (less € 50 administration costs) will be granted only if notification of cancellation is given to the workshop secretariat before 15 April 2016. After this date no refund will be made. Refunds will be processed after the Workshop.

Insurance

The organisers cannot be held responsible for any personal accident or damage to the property of the participants.

Personal data

Personal information supplied to EMAS will be held on computer and will be used only for purposes connected with the activities of the European Microbeam Analysis Society.

Hotel accommodation

Hotel accommodation is arranged in Avignon. It is recommended that hotel bookings are made as soon as possible. Some possibilities are available through the [Avignon Tourism Office](#). Another possibility is to stay in the [Le Yatis Hotel](#) close to the CEA Marcoule research centre.

4. LOCATION

The workshop will be held at the Institut de Chimie Séparative de Marcoule (ICSM), which is located next to the CEA Centre de Marcoule in Bagnols-sur-Cèze, near the Rhone River. A complimentary coach transfer is offered between Avignon and Marcoule (45 min).



Avignon is a beautiful historical town; it was capital of Christendom in the middle Ages. Many monuments remind of this glorious history: the Palace of the Popes, the Saint-Benezet bridge (Pont d'Avignon) - of worldwide fame through its commemoration by the song, and the ramparts, constitute an exceptional complex of monuments listed by UNESCO as a World Heritage site.

Sightseeing

After having explored the city of Avignon, you can also visit its surroundings, with several UNESCO World Heritage Cultural Sites, namely Roman monuments in Orange, Arles, the Pont du Gard, and the Decorated Cave of Pont d'Arc (grotte Chauvet).

How to get to Avignon

- By air

- a) [Avignon Caumont airport](#) (low-cost companies); 8 km from Avignon.
- b) [Marseille-Provence airport](#); 57 international destinations including 32 European destinations.
- c) [Airport MP2](#) (low-cost terminal).
- d) [Nîmes-Arles-Camargue airport](#) (low-cost companies).

- By train

- a) Gare Avignon TGV: with direct high-speed lines from Paris (2h40), Paris Charles de Gaulle airport, Geneva, Brussels, Lyon, Strasbourg, Frankfurt, Madrid, Barcelona, Munich and Amsterdam. There are frequent local trains to the Gare Avignon Centre.
- b) Gare Avignon Centre: regional trains, intercity lines, TGV (high speed train) to Paris (3h20) and Eurostar Avignon-London.

Rail traffic information, timetables, tickets, and on-line booking: uk.voyages-sncf.com/en/.

- By car

Avignon can be reached by the A7 Highway (exit Avignon Nord when coming from Paris and Lyon, or exit Avignon Sud when coming from Marseille, Nice, and Italy).

Avignon can be reached by the A9 Highway (exit Remoulins when coming from Nîmes, Montpellier, and Spain).

Information on parking in Avignon can be found [here](#).

About the CEA Centre de Marcoule and the Institut de Chimie Séparative de Marcoule

[CEA Marcoule](#) has been active in the Gard (South of France) for a long time, working for the Defence Department, then the nuclear industry for more than 50 years. It is in charge of nuclear operations at the site, where there are 1,600 people working on a daily basis in Research and Development processes in the downstream phases of the nuclear fuel cycle.

[ICSM - Marcoule Institute for Separative Chemistry](#) is a Joint Research Unit (Unité Mixte de Recherche UMR 5257) between CEA, CNRS, University of Montpellier, and the Ecole Nationale Supérieure de Chimie de Montpellier (ENSCM). Its main mission is to innovate for selective separation and recycling. The institute hosts the Laboratory for the Study of Matter under Environmental Conditions.

5. KEY DATES

15 February 2016	deadline for submission of abstracts for poster presentations
15 February 2016	deadline for applications for EMAS Bursaries
1 March 2016	notification of acceptance of poster contributions
1 March 2016	notification of decisions on EMAS Bursary applications
31 March 2016	early registration deadline
8-11 May 2016	EMAS 2016 Workshop, Marcoule, France

6. WORKSHOP COMMITTEES, SECRETARIA, WEBSITE

International Scientific Committee

François Brisset	FR
Nicolas Dacheux	FR
Hans Dijkstra	NL
Olivier Dugne (chair)	FR
Xavier Llovet	ES
Michael B. Matthews	UK
Renaud Podor	FR
Silvia Richter	DE

Local Organising Committee

Emmanuelle Brackx	FR
Nicolas Dacheux	FR
Olivier Dugne	FR
Renaud Podor (chair)	FR
Mariette Tuffery	FR
Luc Van't dack	BE

Workshop Secretariat

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