

SIG12

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1. Introduction. (50 words max.)

The main activities of the SIG team have been to prepare the Rovinj and Bergen ECMs, to participate in the organization of various materials-science related meetings and particularly this past year to organize many events linked to the IYCr2014.

2. SIG web site:

SIG12: <http://andr486.wix.com/sig12>

3. Number of ECA individual members registered with the SIG according to (<http://www.xray.cz/eca/im-payment.htm>)

SIG12 Materials Science

202 (on 02/07/2015)

4. Existence of a SIG mailing list: yes

Address of the mailing list: previously ecasig12@uhp-nancy.fr

Number of members in the SIG mailing list: 27 in 2013

5. Approximate total number of researchers involved in the SIG (please indicate the basis for the estimate)

About 220 based on 3. and 4.

6. List of MS organized by the SIG at the last ECM

ECM28 Warwick

SIG12 proposed and was the principal organizer of three microsymposia at ECM28 in Warwick:

1. MS34 Thin films (with SIG 6)
2. MS35 Magnetic materials and in situ studies under magnetic fields (with SIGs 6 and 11)
3. MS36 Twinning, polytypes and modular structures (with SIG3)

Moreover, SIG12 also co-organized the following microsymposia proposed by other SIGs:

1. MS32 Structural studies at extreme conditions by single crystal X-ray diffraction (SIG 11)
2. MS18 From nature to laboratory: crystallography of minerals and mineral-related materials (SIGs 5 and 11)
3. MS20 Crystal physics of minerals and materials at variable pressures and temperatures (SIGs 5 and 11)
4. MS19 Heavy crystals: structural crystallography of heavy-element compounds (SIGs 5 and 11)

All these microsymposia were highly successful and very well attended.

7. Prizes sponsored/coordinated

STOE sponsored a poster prize in the field of the crystallography of functional materials at ECM28 in Warwick.

8. Past Activities other than Microsymposia at ECM

SIG12 members participated in the organization of the 52nd European High Pressure Group International Meeting in Lyon (7-12 September 2014). A special IYCr2014 crystallography session and a plenary lecture on materials crystallography under extreme conditions were organized.

SIG members involved in the event participated as members of the Local Organizing Committee of the VIIth AUSE National Conference and IInd ALBA Users' Meeting in Barcelona (June 16-19, 2015 (<http://auseweb.wordpress.com> and <http://www.cells.es>).

The meeting was not sponsored by ECA. The main sponsors were AUSE (Spanish Users of Synchrotron Radiation), ALBA synchrotron and private companies.

The number of registered participants reached 120 and several prizes were offered (Prize to the best 2014-2015 PhD work using synchrotron radiation, and for young scientists: four prizes to the best posters and two prizes to the best two oral presentations

9. Future/Programmed Activities.

ECM29 Rovinj

SIG12 will organize the following microsymposia:

1. MS16. Physical properties through lattice distortions: structure of perovskites & Co studied by electron microscopy and diffraction (together with SIGS 4, 5 & 11)
2. MS17. In situ and in operando crystallography (support from SIG 11)
3. MS18. Thermoelectric materials – From fundamental science to applications

SIG12 will participate in the organization of the following microsymposia proposed by other SIGs:

1. MS19. Topology of crystal structures (SIG 13)
2. MS13. New instrumentation, methods and approaches in inorganic crystal chemistry (SIG 5)
3. MS14. Mineralogical crystallography: Nature as a source of inspiration for new materials (SIG 5)
4. MS20. High-pressure solid-state chemistry (SIG 11)
5. MS29. Quasi crystals and aperiodic materials (SIG 2,3, 8 & 9)
6. MS41. Advanced powder diffraction: from proteins to organic and inorganic functional materials (SIGs 1 & 8)

ECM30 Basel

SIG12 proposes the following microsymposia:

1. Solid-state oxygen fuel cells, hydrogen storage and battery materials (supported by SIG 11)
2. Materials for energy conversion and harvesting (supported by SIG 11)
3. Structural disorder and materials properties at ambient and non-ambient conditions (supported by SIG11 and SIG3)
4. Functional oxides.

SIG12 will participate in the organization of the following microsymbosia proposed by other SIGs:

- 1- Structure-property relationships in high pressure crystallography (SIG11)
- 2- Crystal chemistry of carbon-bearing materials at extreme conditions (SIG11)
- 3- Correlated electron systems under extreme conditions (SIG11)

10. Other matters. (50 words max.)

SIG 12 officers are actively involved in the conception of new end-stations in ALBA. During last year a Surface and Interface Diffraction beamline (with polarisation analysis) project was presented to the Scientific Advisory Committee (SAC) of ALBA that was positively evaluated (ALBA, December 2014). SIG 12 officers have also worked on the development of *in situ* single crystal diffraction on the CRISTAL beam line at SOLEIL.

Moreover, members of SIG 12 are also involved in the realisation and use of experimental stations and new sample environments at large scale facilities (Petra-III in Hamburg, FRM-II in Munich and ESRF and ILL in Grenoble) to open new possibilities for the structural investigation of functional materials under *in situ* and *in operando* conditions. ALBA is currently in operation mode, and users are already performing experiments in different areas of soft and hard Materials Science. ALBA has recently started the building process of a new Angle-Resolved Photoemission beamline.

11. Brief annual activity report (100 words max.)

SIG12 members were strongly involved in various activities for IYCr2014 (visits, exhibitions, conferences). SIG 12 participated in the organization and presented communications in the materials science related microsymbosia at the IUCr Congress and General Assembly in Montreal. A joint SIG11/SIG12 meeting was also organized in Montreal. We are proposing a number of microsymbosia for the Rovinj and Bergen ECM meetings. SIG officers are also involved in the organization of conferences and workshops related to materials crystallography at material science and diffraction-related meetings. The members of SIG 12 strongly participate in the development of methods at large scale facilities (e.g. at synchrotron and neutron facilities) and organized a National Spanish Conference of Spanish users of synchrotron radiation (AUSE) in collaboration with ALBA..

12. List SIG officers, name and e-mail, and specify their main function in the SIG:

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