EUROMAT 2011 – Rapport Scientifique

Contexte et aspects généraux

Les Conférences Euromat, organisées tous les deux ans depuis 1989 sous l'égide de la Fédération Européenne des Sociétés de Matériaux (FEMS), sont devenues des événements de première grandeur en Europe, où elles réunissent des chercheurs et ingénieurs universitaires et industriels de la science et technologie des matériaux. Chacune de ces conférences est organisée par une société savante nationale membre de la FEMS, et son comité scientifique est construit à partir de chercheurs de toute l'Europe, en coordination avec la FEMS. Ces réunions internationales constituent un événement majeur dans le calendrier de la communauté européenne de la science des matériaux. Dans cette 12ème édition d'Euromat, un accent particulier était mis sur le lien entre la science des matériaux et ses applications, entre la recherche académique et l'industrie.

Euromat 2011 a été organisé sous la responsabilité conjointe des sociétés française et italienne de la FEMS : la Société Française de Métallurgie et de Matériaux (SF2M) et l'Associazione Italiana de Metallurgia (AIM).

Euromat 2011 a été un très grand succès, et apparaît comme la plus grande conférence Euromat jamais organisée. 2150 inscrits ont participé à la conférence. La manifestation proprement dite a été accompagnée d'une exposition industrielle qui a réuni 50 exposants, ce qui est très au-dessus du nombre d'exposants des conférences Euromat précédentes.

Bien que cette conférence soit affichée comme « Européenne », les participants provenaient de 59 pays différents du monde entier. La majeure partie des participants venaient d'Europe, avec pour principaux pays contributeurs la France (540), l'Allemagne (350), l'Espagne (131), le Royaume Uni (126), l'Italie (86), la Pologne (73), la Suisse (71), la Fédération de Russie (54), la république Tchèque (50), la Belgique (39), mais environ 15% des participants venaient d'autres continents (96 du Japon, 45 des USA, 40 de Corée du Sud, 33 du Brésil, 25 d'Algérie, 14 d'Australie, 12 du Mexique, 11 du Canada, 10 d'Argentine...)

Réalisations scientifiques

Conférences plénières

8 conférences plénières ont été données pendant les 4 jours d'Euromat, dont les sujets abordaient un ensemble de défis posés à la science des matériaux pour répondre aux besoins sociétaux ainsi que certains des développements et innovations les plus récents :

- *Innovation in materials teaching*, Mike Ashby, Cambridge University, UK
- *Materials research and development for europe*, by Marcin L. Sadowski, Directorate for Industrial Technologies, European Commission, Directorate-General for Research and Innovation
- *Challenges in materials science for a sustainable "habitat"*, by Mathieu Joanicot, Directeur Scientifique, Saint Gobain Recherche, France
- *Physical metallurgy meets industry: do physical fundamentals serve industrial materials processing?,* by Prof. Günter Gottstein, Institute of Physical Metallurgy and Metal Physics, RWTH Aachen University, Germany (FEMS European Materials Medal)
- *Field assisted sintering of oxide ceramics,* by Prof. Olivier Guillon, Institute of Materials Science, Technische Universität Darmstadt, Germany (FEMS Materials Science and Technlogy Prize)

- *Scale effects in fibre composites and surface coatings: microstructure, transport phenomena and mechanics*, by TW Clyne, Department of Materials Science, Cambridge University, UK
- *Implantable sensors: safety and efficiency*, by Paddy French, EI-EWI/DIMES, TU Delft
- *New ionic liquids and nanocrystalline electrode materials for the conversion of sunlight to electric power and its storage in lithium ion batteries*, by Michael Graetzel, Ecole Polytechnique Fédérale de Lausanne, Switzerland (FEMS Materials Innovation Prize)

Topics et symposia

Les conférences Euromat sont traditionnellement organisées en « topics » qui regroupent plusieurs « symposia ». Euromat 2011 comportait 53 symposia regroupés en 21 topics. Les symposiums étaient constitués de 2 à 9 sessions, et 1 à 3 conférences invitées (« keynote lectures ») selon le nombre de propositions de communications orales reçues. Chaque session correspondait à 6 communications orales. 20 sessions parallèles étaient présentées, ce qui a permis un ensemble de 1210 exposés oraux, incluant 63 conférences invitées (de durée double). Les journées commençaient à 8H30 par la session plénière, et les sessions orales se terminaient à 18H40.

Deux sessions de présentations par affiches (« posters ») ont été organisées en soirée (19H-21H) les lundi et mercredi, respectivement pour 643 et 760 posters. Un cocktail devant les affiches était proposé aux participants pendant ces sessions. Ces sessions poster ont eu un grand succès, avec une forte participation et des discussions devant les affiches jusqu'à la clôture des salles. 10 à 20% des affiches attendues n'ont pas été présentées (« no show »)

Les détails pour chaque symposium sont réunis en annexe. Seule une présentation générale et quelques commentaires sont donnés ici :

- **Matériaux fonctionnels (topic area A)**. Ce domaine prend une importance croissante dans les conférences Euromat. En 2011 elle comprenait 3 topics : les matériaux magnétiques (un domaine qui a atteint un statut important en 2011), les matériaux pour les nanostructures (nanotubes de carbone et graphène, matériaux mesoporeux), matériaux fonctionnels polymères et hybrides (biopolymères, biocomposites, matériaux hybrides), ainsi que les matériaux et systèmes pour MEMS/NEMS (en particulier pour les applications sensorielles et d'actuateurs) et autres (matériaux à mémoires de forme).
- **Matériaux de structure (topic area B)**. Ce domaine traditionnellement très fort dans les conférences Euromat a inclus cette année un ensemble de symposia dédiés à des métaux et alliages particuliers (intermétalliques, superalliages à base nickel, aciers innovants et composites à base d'acier, alliages de magnésium) des céramiques avancées (fracture et fiabilité des céramiques, barrières céramiques : filtres, membranes, protections thermiques), les matériaux composites et hybrides (matériaux renforcés de nanoparticules et nanofibres, matériaux à très haute porosité, matériaux architecturés céramiques, hybrides et organique-métal), ainsi que des symposia dédiés à de nouveaux concepts (matériaux bio-inspirés, matériaux autonettoyants ou autocicatrisants), qui ont obtenu un succès particulier et ont été suivis par un nombre de participants très supérieur à ce qui était attendu, ainsi qu'un symposium consacré aux matériaux de l'héritage culturel.
- **Elaboration (topic area C)**. Ce domaine, aussi bien établi dans les conférences Euromat, était organisé selon 4 axes classiques : la solidification et les transformations de phases, l'assemblage, les techniques d'élaboration à base de poudres (métallurgie des poudres et céramiques), les revêtements et l'ingénierie des surfaces. Un cinquième axe était consacré aux nouveaux concepts en élaboration des matériaux : techniques permettant un « développement durable » (les liquides ioniques et sels

fondus, procédés métallurgiques à haute température et recyclage), fabrication additive de matériaux avancés.

- **Caractérisation et modélisation (topic area D).** Ces topics étaient consacrés à de nouvelles techniques, qui peuvent être appliquées à des matériaux et structures variés, et étaient séparés en trois familles : les techniques de caractérisation structurale (techniques originales de diffusion et diffraction, tomographie de rayons X et de neutrons, techniques nanotomographiques), techniques de caractérisation mécanique (meso/macro/microstructure, et matériaux nanostructurés) et la modélisation des matériaux et de leurs propriétés à différentes échelles (calcul *ab initio*, propriétés des matériaux, aux échelles micro et nano, modélisation multiéchelle, thermodynamique et diagrammes de phases).
- **Energie et applications associées (topic area E)**. Bien que des symposia sur ce thème aient déjà été organisés dans les manifestations antérieures, c'était la première fois que ces applications étaient ainsi mises en exergue. 7 symposia ont été organisés, qui ont obtenu un grand succès, groupés en 3 topics : production d'énergie et applications associées (énergie nucléaire, management thermique), matériaux pour l'énergie pour une société durable (photovoltaïque, stockage et conversion de l'énergie, thermoélectriques), matériaux pour le transport.
- **Matériaux pour la santé (topic area F)**. Comme le précédent, ce domaine qui comportait déjà des symposia dans les éditions antérieures, a été présenté avec une visibilité spécifique dans Euromat 2011. Cela a donné lieu à 3 symposia très réussis, dédiés aux revêtements bioactifs et interfaces matériau-tissus, aux matériaux intelligents et biomimétiques pour les applications biologiques, et enfin à la caractérisation et la modélisation mécaniques des tissus et matériaux biologiques.
- **Education (topic G).** Ce domaine, considéré comme très important par le comité scientifique, ne comprend classiquement qu'un seul symposium, destiné à profiter de la présence de professeurs, d'étudiants et d'ingénieur en activité dans l'industrie, pour échanger et partager leur expérience en matière d'éducation en science des matériaux. En 2011, en plus des présentations orales normales, il était soutenu par une conférence plénière du Professeur Michael Ashby, et comprenait une table ronde sur l'éducation en science des matériaux. Les détails de ce symposium sont données dans l'annexe.

Publication

Les conférences Euromat sont des conférences qui ne comportent pas de publication des actes. Tous les participants d'Euromat 2011 ont néanmoins reçu un CD comprenant l'ensemble des résumés des communications présentées dans le programme final. Par ailleurs, les organisateurs de symposia ont été encouragés à organiser la publication, dans des numéros dédiés de revues scientifiques. Un certain nombre d'organisateurs ont répondu positivement et organisé ces publications : A54, B14, B15, B24, B33, C13, C21/C22, C31/C32, D12, F11/F12, F14 (les revues sont précisées dans l'annexe).

Conclusion

Les très gros congrès multisessions comme Euromat 2011 sont des événements « lourds », qui doivent être justifiés par une « valeur ajoutée » spécifique :

- Etre un point de rencontre d'une large communauté de chercheurs de l'université et de l'industrie, dans lequel les participants sont assurés de rencontrer un grand nombre de collègues de leur domaine ainsi que de domaines voisins ;
- Donner aux participants, de l'université et de l'industrie, la possibilité d'avoir une vue d'ensemble sur un large spectre d'activités scientifiques, de nouveaux résultats, des tendances du moment ;

- Donner la possibilité aux participants d'assister à des symposia, sessions spécifiques, communications invitées ou normales dans des domaines qui n'auraient pas justifié leur déplacement dans un colloque spécifique isolé ;
- Donner à des scientifiques l'occasion d'organiser des symposia dans leur domaine, et, en tant qu'organisateurs, de concentrer leurs efforts sur les aspects scientifiques et le programme, pendant que les aspects pratiques et logistiques sont pris en charge par l'organisation générale de la conférence.

Le large programme et la très forte participation à Euromat 2011, comme les retours des participants et des organisateurs, indiquent que ces critères ont été très bien satisfaits à Montpellier. Nous souhaitons que la prochaine conférence Euromat 2013, qui doit se tenir à Séville, obtienne un succès similaire, et même plus.

Jean-Marc Chaix,
Président du comité scientifique d'Euromat 2011

Annexe Compléments sur les symposiums d'Euromat 2011

Cette annexe est construite à partir des réponses des organisateurs à un questionnaire-bilan: nous tenons à les en remercier chaleureusement.. Les chiffres de participation aux séances ont été obtenus à partir de comptages réalisés dans les salles 15 minutes après le début de chaque session.

Topic A2 Magnetic Materials (Ludwig Schultz, DEU)

Symposium A21 Hard and Soft Magnetic Materials

Organiser and co-organisers	Nora Dempsey(FRA), Marco Coïsson(ITA), Manfred Albrecht(DEU)		
Covered topics	Soft magnetic materials properties for: high frequency applications, sensors and nanotechnology, High efficiency and energy saving applications Hard magnetic materials – films, bulk (sintered, nanocrystalline), applications		
Organiser's scientific comments	*Particularly novel results:* Novel nanocrystalline soft magnetic alloys for energy saving (1051), Domain wall motion in soft microwires by electrical currents (0162), Polymer coated magnetic nanoparticles for magnetic inks and inkjet printing (0549), high coercivity magnets for electric vehicles (2240), atomic scale characterisation of high performance magnets (1285) *General comments:* This particular session was better attended, and of higher quality, than that at the last Euromat (Glasgow 2009) as the meeting is now better know in the magnetic community. *Quality of discussion:* good		
Contributions	Oral lectures: 42	Posters: 53	cancelled Oral: 4
Attendance in sessions	Average : 40	max 55	
Organiser's remarks/suggestions	The possibility of publishing submitted manuscripts, after rigorous peer review, can help raising the quality of the contributions; however, adequate financial and technical assistance has to be given to symposium organizers, as managing manuscript submission, reviewing processes and interaction with a journal is much beyond the possibilities (and the budget) of symposium chairs.		

Symposium A23 Magnetocalorics

Organiser and co-organisers	O. Gutfleisch (DEU), Karl G. Sandeman (GBR)		
Covered topics			
Organiser's scientific comments	*Not available*		
Contributions	Oral lectures: 25	Posters: 15	cancelled Oral: 3
Attendance in sessions	Average : 35	max 45	
Organiser's remarks/suggestions			

Symposium A24 Magnetic Nanostructures and Particles

Organiser and co-organisers	Maria del Puerto Morales (ESP), Bernd Rellinghaus (DEU)		
Covered topics			
Organiser's scientific comments	*Not available*		
Contributions	Oral lectures: 48	Posters: 76	cancelled Oral: 6

Attendance in sessions	Average :	70	max	100		
Organiser's remarks/suggestions						

Topic A3 Materials for Nanostructures (Eric Anglaret, FRA)

Symposium A31 Carbon nanotubes and graphene

Organiser and co-organisers	Eric Anglaret (FRA), Nicole Grobert (FRA)					
Covered topics	*Carbon nanotube-baseed composites * Carbon nanotube synthesis * Properties of carbon nanotube networks * Applications of carbon nanotubes * Properties of individual carbon nanotubes * Graphene					
Organiser's scientific comments	*General comments:* Most of the results presented are already published. However, part of papers A31-O-2-3, A31-O-2-5, A31-O-2-6, A31-O-3-1-K, A31-O-3-2, A31-O-3-3, A31-O-3-4, A31-O-3-5, A31-O-4-3, were not published yet and particularly novel *Quality of discussion:* good to very good					
Contributions	Oral lectures:	36	Posters:	35	cancelled Oral:	5
Attendance in sessions	Average :	45	max	80		

Symposium A32 Beyond mesoporous materials

Organiser and co-organisers	David Grosso (FRA), Mika Linden (DEU)					
Covered topics	Recent finding around mesoporous materials (synthesis, characterisation, novel materials, various types of application ranging from hard drive to therapeutic vectors).					
Organiser's scientific comments	*Particularly novel results:* Mesoporous therapeutic vectors in their environment, Multifunctionnals hierarchical thin films, Mesoporous metals *General comments:* From the general feedbacks, the symposium was interesting and well balanced. It seems that it was a good idea to bring peoples from various disciplines but working on mesoporous materials. *Quality of discussion:* very good					
Contributions	Oral lectures:	42	Posters:	43	cancelled Oral:	0
Attendance in sessions	Average :	55	max	85		

Topic A4 Functional polymeric materials (José M. Kenny,ESP)

Symposium A41 Biopolymers and biocomposites

Organiser and co-organisers	Lars Berglund (SWE)					
Organiser's scientific comments	*Not available*					
Contributions	Oral lectures:	18	Posters:	13	cancelled Oral:	2
Attendance in sessions	Average :	50	max	55		

Symposium A42 Functional Polymeric Hybrid Materials

Organiser and co-organisers	J.F. Gérard (FRA), Giovanni Camino (ITA)					
Organiser's scientific comments	*Not available*					
Contributions	Oral lectures:	36	Posters:	40	cancelled Oral:	5
Attendance in sessions	Average :	45	max	65		

Topic A5 MEMS, NEMS and other devices (Bradley Nelson, CHE)

Symposium A53 MEMS/NEMS for sensorial and actorial materials

Organiser and co-organisers	Dirk Lehmhus (DEU), Jürgen Brugger (CHE), Nico de Rooij (CHE)				
Organiser's scientific comments	*Not available*				
Contributions	Oral lectures:	24	Posters: 32	cancelled Oral:	2
Attendance in sessions	Average :	25	max 30		

Symposium A54 Shape Memory Alloys (SMA) – Materials and Devices

Organiser and co-organisers	Ausonio Tuissi (ITA), Ruben Santamarta (ESP)				
Covered topics	SMA processing and characterization ; Cu based shape memory alloys ; Modelling and simulation ; microstructure and materials characterization ; ferromagnetic shape memory alloys ; SMA surface engineering and maedical applications				
Organiser's scientific comments	*Quality of discussion:* very good				
Contributions	Oral lectures:	36	Posters: 31	cancelled Oral:	3
Attendance in sessions	Average :	35	max 50		
Publication of selected papers	FML – Functional Materials Letters				
Organiser's remarks/suggestions					

Topic B1 Advanced Metals (Martin Heilmaier, DEU)

Symposium B11 Intermetallics

Organiser and co-organisers	David Morris (ESP), Olivier Tougait (FRA)				
Covered topics	Mostly microstructure control and structural intermetallics. Separate (oral) sessions then for titanium aluminides, iron aluminides, silicides, and for nickel based intermetallics. One (oral) session was strongly related to coatings				
Organiser's scientific comments	*Particularly novel results:* significant progress in alloying of new Laves and silicide composites ; new processing methods evaluated for preparation of standard intermetallic alloys. *Quality of discussion:* very good				
Contributions	Oral lectures:	30	Posters: 23	cancelled Oral:	0
Attendance in sessions	Average :	60	max 70		
Organiser's remarks/suggestions	Monday was excessively long: days should be kept shorter				

Symposium B12 Nickel-Based Superalloys

Organiser and co-organisers	Roger C Reed (GBR), Tresa Pollock (USA)				
Organiser's scientific comments	*Not available*				
Contributions	Oral lectures:	30	Posters: 23	cancelled Oral:	2
Attendance in sessions	Average :	65	max 100		

Symposium B13 Novel steels and steel matrix composites

Organiser and co-organisers	Horst Biermann (DEU) Wolfgang Bleck (DEU)		
Covered topics	Microstructures, mechanical properties and models for high manganese steels ; deformation and deformation mechanisms in high-alloyed steels with TRIP & TWIP effect		
Organiser's scientific comments	*Particularly novel results:* improved physical understanding of the TWIP effect ; quantification of parameters for TRIP/TWIP control ; new concepts for ultrahigh strength steels ; deformation mechanisms, mechanisms and kinetics of phase transformations of metastable steel *Quality of discussion:* very good		
Contributions	Oral lectures: 30	Posters: 21	cancelled Oral: 1
Attendance in sessions	Average : 50	max 65	
Organiser's remarks/suggestions	The room was too small (65 seats)		

Symposium B14 Mg Alloys

Organiser and co-organisers	Karl Ulrich Kainer (DEU), Joseph Robson (GBR)		
Covered topics	Phase formation and casting of Mg-alloys ; Twin Roll Casting od Mg-alloys ; Mg wrought alloys ; Deformations of Mg alloys ; Microstructure evolution ; Corrosion		
Organiser's scientific comments	*Particularly novel results:* Phase formation and microstructure evolution in Mg-Zn-X-alloys (X=Al, RE etc.) (B14-O-3-6, B14-O-4-1, B14-O-2-2) *Quality of discussion:* very good		
Contributions	Oral lectures: 24	Posters: 14	cancelled Oral: 3
Attendance in sessions	Average : 32	max 50	
Publication of selected papers	AEM – Advanced Engineering Materials		
Organiser's remarks/suggestions	The poster session was placed in a narrow sticky room with limited space for discussions, half of the posters were not posted		

Symposium B15 Ultrafine-grained Materials processed by Severe Plastic Deformation

Organiser and co-organisers	Heinz-Werner Höppel (DEU), Reinhard Pippan (AUT)		
Covered topics	Microstructure and Properties ; Intermetallics and nanocomposites ; Advanced SPD-methods and alloys		
Organiser's scientific comments	*Particularly novel results:* Microstructure and Properties: - new aspect in understanding fundamental deformation mechanisms and microstructure Intermetallics and nanocomposites : - New attempts for producing nanocomposites by SPD - SPD-processing of intermetallics, new processing technologies Advanced SPD-methods and alloys - Developments for continuous SPD-processing - SPD-Surface processing *Quality of discussion:* good to very good (depending on the session!)		
Contributions	Oral lectures: 24	Posters: 22	cancelled Oral: 2
Attendance in sessions	Average : 55	max 70	
Publication of selected papers	AEM – Advanced Engineering Materials		
Organiser's remarks/suggestions	The Symposium should be merged for the next time with the Symposium D22: Mechanical characterization of small-scale structures and advanced nanostructured materials. It was a pity, that there was a partial overlap of the symposia, although both symposia are dealing with the same topic.		

Topic B2 Advanced Ceramics (Georg Grathwohl, DEU)

Symposium B22 Ceramic barriers: filters, membranes, and thermal barriers coatings

Organiser and co-organisers	André Ayral (FRA), Christoph Leyens (DEU)		
Covered topics	This symposium offered a good overview on recent advances in: - post-functionalization or post-treatment of ceramic membranes for enhancing their performance in gas or liquid treatments (*session 1: Membranes*); - High temperature behavior and transport mechanisms in different types of ceramic barriers working at high temperature (*session 2: High-temperature membranes, filters and thermal barrier coatings*); - thermal damaging of thermal barrier coatings mainly for aeronautical applications (*session 3: Thermal barrier coatings*).		
Organiser's scientific comments	*Particularly novel results:* Regarding this question, the three selected papers in term of quality and novelty are : - *Session 1: Membranes* B22-O-1-1-H - Possible modification strategies of MFI zeolite membranes, by M. Drobeck et al. - *Session 2: High-temperature membranes, filters and thermal barrier coatings* B22-O-2-1-H - Performance of high temperature CO2 selective dual phase membranes, by R.Bredesen et al. *Session 3: Thermal barrier coatings* B22-O-3-6 Testing Thermal Barrier Coatings by Laser Excitation Oral, by D. Nies et al. *General comments:* The symposium was scheduled during the last day of the conference which is not favourable in term of attendees. Nevertheless the attendance level was always good even during the last session. After each oral presentation, the scientific quality of the discussion was very good with, in each case, several relevant questions. *Quality of discussion:* very good		
Contributions	Oral lectures: 18	Posters: 23	cancelled Oral: 0
Attendance in sessions	Average : 30	max 35	
Organiser's remarks/suggestions	An important part of posters were missing during the poster session		

Symposium B24 Fracture and Reliability of Ceramics and Hybrid Materials

Organiser and co-organisers	Jérôme Chevalier (FRA), Bill Clegg (GBR)		
Covered topics			
Organiser's scientific comments	*Not available*		
Contributions	Oral lectures: 24	Posters: 17	cancelled Oral: 2
Attendance in sessions	Average : 30	max 40	
Publication of selected papers	Journal of the European Ceramic Society		

Topic B3 Hybrid and Composite Materials (Bill Clyne, GBR)

Symposium B31 Composites containing Nano-particles and Nano-fibres

Organiser and co-organisers	Aravind Dasari (ESP)		
Covered topics	Polymer-based nanocomposites: thermal and mechanical properties ; Functional properties of organic nanocomposites (including optical and electrical properties) ; Characterization of nanocomposites ; Metal-matrix composites, their processing and mechanical properties ; Nanocomposite coatings		
Organiser's scientific comments	*Particularly novel results:* As expected, keynote by Prof Withers and highlight lecture by Prof Camino were well received though the latter gave more of a fundamental overview of the topic. some presentations stood out; for instance, B31-O-3-1, B31-O-3-2, B31-O-5-3 and B31-O-4-5. The topics these presentations covered range from 3D characterization of polymer nanocomposites to nanocomposite coatings for corrosion protection. *General comments:* for most of the time, I have noted very active participation of audience. This is excellent considering 20 simultaneous sessions and the broad scope of the conference as well as the symposium (B31) *Quality of discussion:* very good		
Contributions	Oral lectures: 30	Posters: 42	cancelled Oral: 4
Attendance in sessions	Average : 60	max 100	
Organiser's remarks/suggestions	It would be useful to computerize the registrations so that we (symposium organizers/session chairs) know exactly whether the respective speakers are physically present at the conference or not.		

Symposium B32 Hybrid and Metal-Organic Framework Materials

Organiser and co-organisers	Jin-Chong Tan (NLD)		
Covered topics	1. Synthetic methods and emerging applications 2. Thin films, membranes and patterned growth 3. Computational studies 4. Adsorption, storage and triggered delivery 5. Structure-property correlations and characterization methods		
Organiser's scientific comments	*Particularly novel results:* 1. Metal-organic framework (MOF) materials for triggered drug delivery applications (B32-K-4-1; B32-H-1-1). 2. Thin-film structures of MOF-type materials exhibiting multifunctional properties (B32-O-2-2; B32-O-2-3; B32-O-2-5). 3. Application of ab-initio computational methods for predicting the physical properties of hybrid and MOF-type materials (B32-O-3-3-H, B32-O-5-1-H). *Quality of discussion:* very good		
Contributions	Oral lectures: 30	Posters: 36	cancelled Oral: 1
Attendance in sessions	Average : 50	max 70	
Organiser's remarks/suggestions	It would be helpful to have 1) a more streamlined on-line mechanism to track paper (Oral) cancellations, especially during the final stages of programme preparation. 2) direct access to information on speakers' registration, which is a good indication of potential cancellations or no-show.		

Symposium B33 Highly Porous Metals and Ceramics

Organiser and co-organisers	Paolo Colombo (ITA), Peter Degischer (AUT)		
Covered topics	Processing,characterization, modelling, properties and applications of porous metals and ceramics		
Organiser's scientific comments	*Particularly novel results:* L.Courtois (novel structures) ; Suzuki (novel material) ; A.Ortona (modeling) ; J.Curran (novel processing) ; J.Shatt (novel hierarchical structures) ; S.Goudalle (novel development) *Quality of discussion:* very good		
Contributions	Oral lectures: 24	Posters: 20	cancelled Oral: 1
Attendance in sessions	Average : 35	max 45	
Publication of selected papers	AEM – Advanced Engineering Materials		
Organiser's remarks/suggestions	A board for job announcements/opening would have been very useful; I suggest that Euromat considers making this available at forthcoming conferences		

Topic B4 New Concepts in Structural materials (Sybrand Van der Zwaag,NLD)

Symposium B41 Bioinspired materials

Organiser and co-organisers	André Studart(CHE), Cordt Zollfrank(DEU), Richard Weinkamer(DEU)		
Covered topics	Natural materials and systems; bioinspired and biomimetic composites and structures		
Organiser's scientific comments	*General comments:* the room was too small : more people were attracted but could not find a place to sit (45 seats) or stand *Quality of discussion:* outstanding		
Contributions	Oral lectures: 18	Posters: 10	cancelled Oral: 2
Attendance in sessions	Average : 55	max >55 (limited by room size)	
Organiser's remarks/suggestions	Provide water in hot countries for delegates		

Symposium B42 Cultural Heritage Materials

Organiser and co-organisers	Antonio Sgamellotti (ITA)		
Covered topics	The topics covers several methodologies and techniques to characterize the constituent materials, the states of conservation and the working technologies of ancient, modern and contemporary artworks. Both the non-invasive and micro-invasive techniques are presented at their state of art.		
Organiser's scientific comments	*Particularly novel results:* The methodologies of material science from lasers and SERS technologies to synchrotron radiations are applied to artworks, which are precious and unique. The ultimate objectives are their conservation and degradation states. *General comments:* The scientific level of the presentation and discussion is between very good and outstanding. It is to remark that both speakers and attendees were young researchers. *Quality of discussion:* very good to outstanding		
Contributions	Oral lectures: 12	Posters: 4	cancelled Oral: 1
Attendance in sessions	Average : 15	max 20	
Organiser's remarks/suggestions	My suggestion is to organize again this symposium in the Seville Euromat 2013		

Symposium B45 Self healing / self cleaning materials

Organiser and co-organisers	Santiago J. Garcia (NLD), Sybrand Van der Zwaag (NLD)		
Covered topics	The symposium covered materials development in the fields of self-healing materials (including organic coatings, concrete, membranes, and corrosion amongst others) and self-cleaning surfaces (including superhydrofilicity and superhydrophobicity of polymeric and ceramic surfaces).		
Organiser's scientific comments	*Particularly novel results:* almost all papers presented new concepts and new results, but some papers were outstanding in this respect: as 0999, 2904, 2609. While other papers showed little innovation. Some of the new and important concepts presented covered issues as the preparation of ceramic superhydrophobic surfaces (normally are polymeric), self-healing membranes (no previous studies reported this), new concepts in corrosion protection by self-healing (single reactive healing agent, normally two are required), and very stable superhydrophobic surfaces (wear resistance is one of the main limitations of superhydrophobic surfaces) *General comments:* both self-healing and self-cleaning surfaces attract a lot of attention from many different fields and the assigned room was too small by far: too many people stayed outside the room. In general, I am very satisfied with the outcome of the symposium both from presentations content and from audience attendance and participation *Quality of discussion:* very good		
Contributions	Oral lectures: 18	Posters: 11	cancelled Oral: 3
Attendance in sessions	Average : 55	max >55 (limited by room size)	
Organiser's remarks/suggestions	Papers that did not show up and did not communicate should be included in a sort of black list that warns the organizers the next time they want to present a paper in the Euromat. In this respect I would also like to ask the organization to establish some sort of control in this respect: non-show up papers mean at least two papers do not present their work, the one that didn't show up, and the one that could have presented in that slot and finally had a poster. More control is necessary.		

Topic C1 Solidification and Solid State Transformations (Michel Rappaz, CHE)

Symposium C11 Solidification

Organiser and co-organisers	Charles-André Gandin (FRA), Jean-Marie Drezet (CHE)		
Covered topics	This symposium covered the topics of processes, mushy zone dynamics, microstructure and defects analyzed with the help of modern materials science and engineering tools such as modelling and in situ observations. Aspects such as nucleation and growth kinetics, rapid solidification, phase competition, microsegregation, dendritic, eutectic and peritectic microstructures, porosity, residual stresses, distortions, hot tearing, micro- and macro-segregation were also presented. The symposium allowed us to see the recent developments in the field of solidification from both experimental and theoretical points of views.		
Organiser's scientific comments	*Particularly novel results:* The presentation of studies using in-situ observations of solidification were of high quality (papers no. 0125, 1587, 0580 and 0969). *Quality of discussion:* very good		
Contributions	Oral lectures: 42	Posters: 32	cancelled Oral: 1
Attendance in sessions	Average : 50	max 70	
Organiser's remarks/suggestions	this symposium was placed at the end of the conference, especially on Thursday, when many attendants leave		

Symposium C12 Solid State Transformations

Organiser and co-organisers	Benoit Appolaire (FRA), Frédéric Danoix (FRA)		
Organiser's scientific comments	*Not available*		
Contributions	Oral lectures: 42	Posters: 31	cancelled Oral: 2
Attendance in sessions	Average : 60	max 130	

Symposium C13 Metallic glasses and related composites: new routes for functional and strong materials

Organiser and co-organisers	Mihai Stoica (DEU), Kostas Georgarakis (FRA)		
Covered topics	Atomic structure, modelling, mechanical properties, magnetic properties, nanocomposites, phase transformation, preparation and synthesis, biocompatibility (all related to amorphous and nanocrystalline alloys).		
Organiser's scientific comments	*Particularly novel results:* Atomic structure studied by in-situ vitrification (2861), enhancement of plasticity (1884), shear banding in BMGs (2726), synthesis of functional porous metallic glass composites (0903), forming in supercooled liquid region (3001), industrial challenges (2567). *General comments:* Beside the fact that this year two major & historical conferences dedicated to metallic glasses were organised (ISMANAM 2011 Gijon, Spain and RQ14 Salvador, Brazil), the attendance of C13 symposium was very good. More, there one should remark the participation of several researchers from outside Europe: Japan, Korea, USA etc. Nevertheless, the participation of people from abroad (and not only) was also related to the visibility in the scientific world of the symposium organisers. Some of the presented works will be published in a peer-reviewed journal, Revue de Métallurgie. *Quality of discussion:* very good		
Contributions	Oral lectures: 30	Posters: 25	cancelled Oral: 6
Attendance in sessions	Average : 50	max 55	
Publication of selected papers	Revue de Métallurgie		
Organiser's remarks/suggestions	keep such symposium (or at least the topic) also for the future EUROMAT Conferences.		

Topic C2 Joining (Alberto Passerone, ITA)

Symposium C21 Wetting, soldering and brazing

Organiser and co-organisers	Fiqiri Hodaj (FRA), Maria Luigia Muolo (ITA)		
Covered topics	Wetting and joining metal-metal, metal-ceramic, ceramic-ceramic: basic science, applications and modelling; mechanical performance of joints.		
Organiser's scientific comments	*Particularly novel results:* the very good level of the contributions does not permit to indicate a particular one. *General comments:* The most important result evidenced in the symposium is that now it is clear to the scientific community that theory, modelling, experimental studies and applications must work close to each other. *Quality of discussion:* very good		
Contributions	Oral lectures: 18	Posters: 39	cancelled Oral: 0
Attendance in sessions	Average : 50	max 65	
Publication of selected papers	JMEP – Journal of Materials Engineering and Performance		
Organiser's remarks/suggestions	Excellent level of this conference from all points of view;		

Symposium C22 Diffusion bonding and characterization

Organiser and co-organisers	Robert Filipek (POL), Natalia Sobczak (POL)		
Organiser's scientific comments	*Not available*		
Contributions	Oral lectures: 18	Posters: 21	cancelled Oral: 4
Attendance in sessions	Average : 40	max 45	
Publication of selected papers	JMEP – Journal of Materials Engineering and Performance		

Topic C3 Powder routes : from synthesis to materials (Alberto Molinari, ITA)

Symposium C31 Powder Synthesis and Processing

Organiser and co-organisers	José Manuel Torralba (ESP), Hervé Muhr (FRA)		
Covered topics	In the call of the symposium was proposed the development of tailored powders and innovative methods from the various possible synthesis techniques, from chemical engineering (solution precipitation, fluid phase) to mechanical methods (high energy milling, mechanical alloying), and it was fulfilled by the presenting authors. We could consider that about 1/3 of the paper presented were related mechanical alloying or high energy milling. The other 2/3 of the symposium was devoted, mostly, to the development of nanopowders by different novel synthesis techniques such as hydrothermal processing, sol-gel, colloidal processes, plasma pyrolysis and others.		
Organiser's scientific comments	*General comments:* The level of discussion was not so good because the room was too large for the number of attendees. Sessions were well attended (usually more than 40 people) but the room was over designed (it was a room for more than 300 people) and this produce the impression of being poor attended and a most cold ambient. *Quality of discussion:* average		
Contributions	Oral lectures: 24	Posters: 51	cancelled Oral: 0
Attendance in sessions	Average : 65	max 80	
Publication of selected papers	Powder Metallurgy + Revista de Metallurgia		

Symposium C32 Powder Processing to Controlled Microstructure and Near Net Complex Shape

Organiser and co-organisers	Omer Van der Biest(BEL), Christophe Martin(FRA), Lars Nyborg(SWE)		
Covered topics	Processes related to the powder route with emphasis on microstructure control and alternative powder processes (FAST, selective laser melting, …).		
Organiser's scientific comments	*General comments:* We found that the attendance was good in most sessions and in any case better than in Glasgow. *Quality of discussion:* good		
Contributions	Oral lectures: 24	Posters: 18	cancelled Oral: 0
Attendance in sessions	Average : 35	max 40	
Publication of selected papers	Powder Metallurgy + Revista de Metallurgia		
Organiser's remarks/suggestions	The poster sessions attendance was not rewarding enough for authors but this is a recurrent problem in Euromat conference that need deep rethinking for next conference (CM) One way to enhance the stature of posters is to give them maximum exposure by maximizing the time they will be on display. For instance in Montpellier Poster 1 session posters could		

	have been on display from Sunday evening till Tuesday afternoon and Session 2 from Tuesday evening till the end of the Conference. Under such exposure conditions a poster can be more interesting than a talk because you can always ask a colleague to accompany you to your poster to introduce the work to him(her). Also there should be more times allotted in the program for poster presentations. Now a poster presenter should in principle stay with his(her) poster during the one session allowed. In principle they do not have the time to look at other posters, only those which are in the physical neighborhood. (OVDB)

Topic C4 Coatings and Surface Engineering (Teodoro Valente, ITA)

Symposium C41 Thin film coatings

Organiser and co-organisers	Teodoro Valente (ITA), Edoardo Bemporad (ITA), Pietro Luigi Cavallotti (ITA)				
Organiser's scientific comments	*Not available*				
Contributions	Oral lectures:	36	Posters: 60	cancelled Oral:	5
Attendance in sessions	Average :	35	max 45		

Symposium C42 Advances in surface treatments of light alloys

Organiser and co-organisers	Suman Shrestha (GBR), James Curran (GBR)				
Covered topics	The symposium covered themes primarily on an emerging surface technology for light alloys, known as plasma electrolytic oxidation (PEO). The topics covered include: i) processing, ii) properties and applications; iii) functional surfaces				
Organiser's scientific comments	*Particularly novel results:* There has been a growing interest in the area of PEO clearly demonstrated by research being undertaken in many parts of the world including Europe, Russia, India within industry as well as academia. While several topics were focused on process understanding by spectral analysis and discharge studies, I feld that application related talks were more useful *e.g.* the use of PEO for protection of light alloys in erosion-corrosion environment. Personally, I found the talk C42-O-2-1 to be simple and clear in terms of understanding/presentation and the use of the technology for applications where other processes had failed. *General comments:* Overall, I am pleased with the symposium and the number of talks for such a novel process and a wider interest levels shown around the world and appreciations and positive remarks by several speakers for arranging such a suymposium dedicated to this novel process. *Quality of discussion:* very good				
Contributions	Oral lectures:	18	Posters: 17	cancelled Oral:	5
Attendance in sessions	Average :	25	max 30		

Topic C5 New concepts in Materials Processing (Bart Blanpain, BEL)

Symposium C51 Sustainable Processes in Ionic Liquids and Molten Salts for Materials

Organiser and co-organisers	George Z. Chen (GBR) , Marcelle.Gaune-Escard (FRA)				
Covered topics	Processes for materials synthesis, treatment and analysis in molten salts and ionic liquids. The topics covered included metals, ceramics, polymers, composites, nanomaterials, lithium storage materials, heat storage ionic liquids, ionogels, catalysts, and analysis and characterisations of molten salts and ionic liquids.				
Organiser's scientific comments	*Particularly novel results:* The Keynote (Fray, molten salts and lithium storage) and the Highlighted (Liu, novel ionic liquid catalysts) lectures were both well presented with almost full occupancy of the lecture room. The talks given by Gussone (molten salts processes for making titanium coated carbon fibres) and Binnemans (liquid metal salts) were highly interesting and novel. The report from a PhD student (Mota-Morales) was of very high quality and clarity. *General comments:* Although having suffered from an unintended conversion of submitted papers to poster presentations, the attendance (> 40) was better than expected. only 10 of the 18 accepted posters (most of these were converted from submissions for oral presentations) were presented, which is not surprising. *Quality of discussion:* very good				
Contributions	Oral lectures:	18	Posters:	18	cancelled Oral: 3
Attendance in sessions	Average :	35	max	55	

Symposium C52 Sustainable high temperature metallurgical processes and engineering materials recycling techniques

Organiser and co-organisers	Bart Blanpain (BEL), Muxing Guo (BEL)				
Organiser's scientific comments	*Not available*				
Contributions	Oral lectures:	24	Posters:	14	cancelled Oral: 3
Attendance in sessions	Average :	30	max	45	

Symposium C54 Additive Manufacturing with advanced materials

Organiser and co-organisers	Nahum Travitzky (DEU)				
Covered topics	Several additive manufacturing techniques were described. For example, 3D printing, selective laser sintering (melting), LDMs, LENS, EBM. Materials ranged from polymers, ceramics, metals to their composites. Applications and models (heat, etc.) were presented.				
Organiser's scientific comments	*Particularly novel results:* most papers talked about understanding the physical and chemical mechanisms during processing, novel materials and their microstructures and properties. *General comments:* Discussions were very productive, interest was high. To my knowledge, this is the first Additive Manufacturing symposium at Euromat. The room was full. *Quality of discussion:* outstanding				
Contributions	Oral lectures:	12	Posters:	2	cancelled Oral: 0
Attendance in sessions	Average :	20	max	25	
Organiser's remarks/suggestions	This symposium should be presented again				

Topic D1 Structural and microstructural characterisation Techniques (John Banhart, Frank Mücklich, DEU)

Symposium D11 Novel Diffraction and Scattering Techniques for Materials Characterization

Organiser and co-organisers	M. E. Fitzpatrick (GBR)		
Covered topics	Novel applications of neutron and X-ray diffraction for materials characterisation ; Development and application of novel techniques ; Residual stress analysis in engineering materials.		
Organiser's scientific comments	*Particularly novel results:* D11-1-4, the development of a neutron transmission detector with significantly higher resolution than has been available previously D11-1-5, the application of neutron Larmor diffraction for the determination of residual stress D11-1-6, a very nice study of the particle size distribution in ODS steels using small-angle neutron scattering D11-2-1, showing combined neutron imaging and diffraction in turbine blades *General comments:* This was a successful symposium. However, by its nature, focussing on the development and application of techniques, there was overlap in content with papers in other symposia focussing on particular areas of application. *Quality of discussion:* very good		
Contributions	Oral lectures: 24	Posters: 15	cancelled Oral: 3
Attendance in sessions	Average : 35	max 60	
Organiser's remarks/suggestions	In a conference with 20 parallel sessions the above mentioned overlap is perhaps not surprising, but perhaps a smaller number of non-overlapping sessions is worth considering.		

Symposium D12 Tomographic 3D imaging with hard X-rays and neutrons

Organiser and co-organisers	Alexander Rack (FRA), John Banhart (DEU)		
Covered topics	− Computed tomography in materials research using different types of penetrating radiation (X-rays and neutrons) − Time resolved microtomography, frequently performed in situ − Approaches for fast data processing and analysis − Novel contrast modalities for, e.g., increased sensitivity		
Organiser's scientific comments	*Particularly novel results:* − Future developments to focus not mainly on resolution anymore but on the different contrast modalities, which, in a ideal manner, should be available for combined application − Performance of laboratory-based dramatically improved in recent years − Large scale facilities to reach for delicate samples to be probed by novel and/or combined contrast modalities − Time resolved microtomography more and more routinely applied *Quality of discussion:* outstanding		
Contributions	Oral lectures: 30	Posters: 19	cancelled Oral: 0
Attendance in sessions	Average : 50	max 60	
Publication of selected papers	IJMR – International Journal of Materials Research		
Organiser's remarks/suggestions	− Poster session: no professional tape to fix the posters was available − Frequently, air conditioning / fresh air would have been needed − Laser pointer etc. should be available for every session		

Symposium D13 Nanotomographic Techniques and 3D Material Microstructures

Organiser and co-organisers	D. Blavette (FRA), F. Mücklich (DEU)		
Covered topics	Atom Probe Tomography, fundamentals, laser interaction theory, 3D reconstruction models, data mining and applications in nanosciences, microelectronics, physical metallurgy, Other tomographic techniques including Xray, electron microscopy		
Organiser's scientific comments	*Particularly novel results:* The use of APT to the investigation of microeletronics ships (D. Larson et al., A. Grenier), that of solar cells (O. Cojocaru et al.), impact of surface diffusion on the spatial resolution of APT (F. Danoix et al) *Quality of discussion:* very good		
Contributions	Oral lectures: 30	Posters: 18	cancelled Oral: 0
Attendance in sessions	Average : 65	max 75	

Topic D2 Mechanical Characterisation Techniques (Reinhard Pippan, AUT))

Symposium D21 Macro/meso-mechanical characterization of materials and microstructural effects

Organiser and co-organisers	Javier Gil Sevillano (ESP), Otmar Kolednik(AUT)		
Covered topics	In situ testing (SEM, TEM, neutron, synchrotron) for plasticity and fracture ; modelling, validation tests ; testing new alloys ; insitu testing new techniques for fracture and fatigue		
Organiser's scientific comments	*Particularly novel results:* -The keynote lecture (JY. Buffière) was excellent (3D high resolution in situ characterization of progress of fatigue damage by using synchrotron X-Rays) -In situ annealing of SPD structures under synchrotron X-Rays. Anomalous relaxation detected (L.Tilly). Interface delamination in stretchable electronics (Hoefnagels° -Fracture of polymers-derived coatings (A.Taylor) *Quality of discussion:* very good		
Contributions	Oral lectures: 36	Posters: 41	cancelled Oral: 3
Attendance in sessions	Average : 60	max 75	
Organiser's remarks/suggestions	D21 and D22 were very related topics. They were scheduled in parallel, it would be better to have put them one after the other. The same remark to other symposia.		

D22 Mechanical characterization of small-scale structures and advanced nanostructured materials

Organiser and co-organisers	Christian Motz (AUT), Eric Le Bourhis (FRA)		
Covered topics	In situ testing, small scale mechanics, nanocrystalline nanocomposites performances, intzerfaces, fractures. These aspects have been addressed both theoretical and experimental sides.		
Organiser's scientific comments	*Particularly novel results:* - novel application of beam flexure at small scale to characterize interface properties - novel in situ test with improved spatial resolution inside SEM, TEM vacuum chamber (with temperature assessment), synchrotron beamline *General comments:* *Quality of discussion:* outstanding		
Contributions	Oral lectures: 36	Posters: 29	cancelled Oral: 2
Attendance in sessions	Average : 60	max 80	
Organiser's remarks/suggestions	Room and infrastructure were OK. Slides and presentation setup was quite adequate and useful.		

Topic D3 Materials Modelling on all Length Scales (Jon Molina, ESP)

Symposium D31 Ab initio based modeling, designing new materials with electronic structure calculations

Organiser and co-organisers	Giovanni Cuniberti (DE)		
Covered topics	The topics of the symposium included: • Electronic, magnetic and structural properties • Hybrid methods for large-scale simulations • Transport properties and biomaterials • Molecular materials for optoelectronics		
Organiser's scientific comments	*Particularly novel results:* The talks presented in symposium D31 reached a very high scientific level. Claudia Ambrosch-Draxl (Ref. Nr. 2731) presented in her Keynote lecture outstanding results on tuning the opto-electronic properties of light-emitting materials. Alessandro De Vita (Ref. Nr. 2690) discussed in his Highlight Talk the multiscale modelling of fracture chemo-mechanics in brittle materials. Daniel Sanchez-Portal (Ref. Nr. 2927) showed novel results on magnetism of functionalized graphene materials. *Quality of discussion:* outstanding		
Contributions	Oral lectures: 24	Posters: 18	cancelled Oral: 5
Attendance in sessions	Average : 40	max 45	
Organiser's remarks/suggestions	• The participants in Symposium D31 expressed their wish to continue and extend the topics of the symposium within EUROMAT. • Excellent on-site organization in Montpellier • The work involved in symposium preparation was too much, I suggest further sharing • I suggest to grant a small number of Keynote and Highlight lectures from the beginning		

Symposium D32 Modelling of Materials Properties at the nano and microscales

Organiser and co-organisers	Javier Segurado (ESP), Anna Serra (ESP)					
Organiser's scientific comments	*Not available*					
Contributions	Oral lectures:	30	Posters:	26	cancelled Oral:	1
Attendance in sessions	Average :	35	max	55		

Symposium D33 Multiscale Modelling of Materials

Organiser and co-organisers	Dierk Raabe (DEU)					
Organiser's scientific comments	*Not available*					
Contributions	Oral lectures:	24	Posters:	8	cancelled Oral:	5
Attendance in sessions	Average :	20	max	25		

Symposium D34 Thermodynamics and phase equilibria; Modelling of phase diagrams

Organiser and co-organisers	Hans Seifert (DEU), Rainer Schmid-Fetzer (DEU), Nele Moelans (BEL)					
Covered topics	Materials thermodynamics, phase diagrams, materials kinetics. Methods: CALPHAD, ab initio, phase field methods, experimental investigations, Knudsen effusion, Calorimetry, coupling CALPHAD/phase field with experimental investigation					
Organiser's scientific comments	*Particularly novel results:* highlights were presentations on coupling CALPHAD with diffusion calculations and CALPHAD with phase field method *General comments:* this symposium was a successful one with lively discussions; *Quality of discussion:* very good					
Contributions	Oral lectures:	30	Posters:	27	cancelled Oral:	1
Attendance in sessions	Average :	35	max	40		
Organiser's remarks/suggestions	it would be great to have such a symposium again at next Euromat conference					

Topic E1 Energy production, transportation and management (Nicolas Dacheux, FRA)

Symposium E11 Materials for Nuclear Applications

Organiser and co-organisers	Nicolas Dacheux (FRA)		
Covered topics	This symposium was divided in 6 sessions dealing with the fuels precursors, the nuclear materials sintering and properties, with alloys for fission and fusion reactors then finally with radwaste matrices and targets. It covered all the aspects of the materials science in the field of nuclear applications (synthesis, ceramic and alloys preparation, sintering, physico-chemical properties, thermodynamics, dissolution and leaching, behavior during irradiation)		
Organiser's scientific comments	*Particularly novel results:* Several very interesting presentations were given. First of all, both keynote lectures on synthesis of ceramics (Clavier, N., E11-O-2-1-K) and on the properties required for the Gen IV nuclear reactors generation (Horowitz, E., E11-O-4-5-K) were strongly appreciated. The Highlight lectures on zirconium carbides (Manara, D.; E11-O-3-6-H), on EPMA analysis on plutonium based materials (Dugne, O., E11-O-1-6-H) and on phosphates as radwaste matrices (Orlova, A., E11-O-6-5-H) were also very interesting. A particular interest (based on the number of participants and of questions) was underlined for E11-O-2-1-K (Clavier, N. ; ≈ 75 participants) and for E11-O-2-3 (Podor, R. ; ≈ 80 participants). *Quality of discussion:* very good to outstanding		
Contributions	Oral lectures: 36	Posters: 32	cancelled Oral: 1
Attendance in sessions	Average : 65	max 80	
Organiser's remarks/suggestions	Due to the number of received abstracts, the selection of oral presentation was too hard to make in a satisfying way (rate of acceptation of about 60%). A lot of proposals moved to posters were evidently suitable as oral presentations.		

Symposium E13 Materials for Thermal Management (heat sink materials)

Organiser and co-organisers	Ludger Weber (CHE)		
Covered topics	Theoretical aspects and considerations on experiment on the interface thermal conductance at the microscale; Surface modification of diamond and carbon materials in order to improve the composite thermal conductivity; Theoretical aspects of two-phase flow for heat extraction. Heat exchangers.		
Organiser's scientific comments	*Particularly novel results:* Two papers (E13-O-1-2 & E13-O-2-1-H) have independently highlighted the finding that a oxygen treatment of the surface of the carbonaceous material would greatly enhance heat transfer across metal/carbonaceous interfaces up to a level comparable to other active element interfaces. This could lead to a major breakthrough in thermal management materials. *Quality of discussion:* very good		
Contributions	Oral lectures: 12	Posters: 8	cancelled Oral: 2
Attendance in sessions	Average : 25	max 30	
Organiser's remarks/suggestions	While there are typically few speakers on the subject of thermal management, interest, especially from industry is typically quite high. The room (30 places was packed during the two sessions (despite the fact that the second session was on Thursday afternoon) and many people had to stand outside of the presentation room.		

Topic E2 Materials for Energy in a Sustainable Society (Susann Schorr, DEU)

Symposium E21 Materials for Photovoltaics

Organiser and co-organisers	S Schorr (DEU)		
Covered topics	Kesterite type absorber materials (structural and optoelectronic properties, magnetic properties, thin film growth processes, high efficient thin film solar cells); chalcopyrite type absorber materials (structural properties, structural defects, off stoichiometric chalcopyrites, in-situ studies of the thin film growth process); compound semiconductor nanowires (synthesis and structural properties); TiO_2 electrode materials (nanocrystals, growth processes, photoconductive properties); buffer layer materials (CdS:O thin films and nanocrystal); window layer materials (thin film growth processes, influence of Al doping)		
Organiser's scientific comments	*Particularly novel results:* world record efficiency of CZTS solar cell (E21-K-1); power of in-situ synchrotron X-ray diffraction methods (E21-O-1-1); TiO2 nanocrystals (E21-O-3-4); Insights into the local structure in off stoichiometric chalcopyrites (E-21-P-1-35; Atom probe tomography as a new method to probe impurities in photovoltaic materials (E21-P-1-07) *General comments:* Very impressive symposium with great discussions. It was really a meeting point for the European experts in this field. *Quality of discussion:* outstanding		
Contributions	Oral lectures: 18	Posters: 35	cancelled Oral: 1
Attendance in sessions	Average : 50	max 55	

Symposium E22 Materials for energy storage and conversion (fuel cells, hydrogen production, batteries etc.)

Organiser and co-organisers	Sebastian Fiechter (DEU)		
Covered topics	1 Materials or water splitting, photoelectrochemical and photocatalytic approaches. 2 Hydrogen Storage: from fundamentals to materials 3 Recharcheable batteries: novel materials, electrode design and characterization techniques 4 Solid oxide fuel cells: materials and design 5 PEM fuel cells: novel membranes and characterization techniques 6 Hydrogen evolution, hydrogen separation and materials for bio-fuel cells.		
Organiser's scientific comments	*Particularly novel results:* - all oral presentations in session E22-1 Materials for water splitting - #1491 (KIT), in E22-2 Hydrogen storage - #2792 (Uni Sao Paulo) in E22-3 Recharcheable batteries - #0696(LEMI-UMR), #0293 (Uni Braunschweig), #1018 and #1020 (POSTECH), #2111 (Uni Trento) in E22-4 Solid oxide fuel cells - #2509 (Uni Oxford) in E22-5 PEM fuel cells - #2013 (UMR CNRS) in E22-6 Hydrogen evolution *Quality of discussion:* average		
Contributions	Oral lectures: 36	Posters: 41	cancelled Oral: 5
Attendance in sessions	Average : 70	max 110	
Organiser's remarks/suggestions	There were poster contributions that could have been shifted to the oral sessions if the groups not showing up had announced it in time.		

Symposium E23 Thermoelectrics

Organiser and co-organisers	Jean-Claude Tedenac(FRA), Bertrand Lenoir(FRA), Sylvie Hébert(FRA)					
Organiser's scientific comments	*Not available*					
Contributions	Oral lectures:	18	Posters:	9	cancelled Oral:	2
Attendance in sessions	Average :	45	max	>45		

Topic E3 Materials for Transportation (Dirk Lehmhus)

Symposium E31 Advanced materials for transportation

Organiser and co-organisers	Kambiz Kayvantash (FRA), Dirk Lehmhus (DEU)					
Organiser's scientific comments	*Not available*					
Contributions	Oral lectures:	24	Posters:	18	cancelled Oral:	3
Attendance in sessions	Average :	45	max	50		

Topic F1 Materials for Healthcare (Aldo R Boccaccini, DEU)

Symposium F11 Bioactive Coatings and Material-Tissue Interfaces

Organiser and co-organisers	Enrica Verne (ITA)					
Covered topics	Bioactive coatings, cell-material interactions, electrochemical coatings, electrophoretic deposition, orthopaedic applications, nanostructured biosurfaces, antimicrobial coatings					
Organiser's scientific comments	*Particularly novel results:* Advanced methods to obtain bioactive coatings Biofunctionalisation of material surfaces *General comments:* The symposium was successful with a variety of topics presented and discussed *Quality of discussion:* very good					
Contributions	Oral lectures:	24	Posters:	15	cancelled Oral:	2
Attendance in sessions	Average :	25	max	30		
Publication of selected papers	Biomedical Materials					

Symposium F12 Smart and biomimetic materials for biomedical applications and tissue engineering

Organiser and co-organisers	João F. Mano (PRT), Aránzazu del Campo (DEU), Aldo R. Boccaccini (DEU)		
Covered topics	Nanobiomaterials and thin coatings; surfaces and devices for biomedical applications; Tissue Engineering; Bioactive and inorganic biomaterials.		
Organiser's scientific comments	*Particularly novel results:* Many presentations and posters focused on the use of osteoconductive inorganic particles (alone, combined with polymers and processed as membranes, scaffolds, or as injectable systems) for different orthopaedic applications, including bone tissue engineering. Nanobiomaterials (nanoparticles, nanofibres, thin multilayered nanostructured films…) were also widely addressed showing that this topic is still in the frontier in the development of biomaterials. The communications demonstrated that biomimetic approaches provide innovative inspirations in the development of new concepts that could be translated into new materials in medicine: surfaces with biomimetic adhesion, superhydrophobic surfaces, bio-inspired needles, use of natural-based polymers, self-healing materials, biomineralization. *General comments:* Although that in many cases the discussion was very alive, the number of attendees was quite small. *Quality of discussion:* good		
Contributions	Oral lectures: 24	Posters: 28	cancelled Oral: 2
Attendance in sessions	Average : 30	max 40	
Publication of selected papers	Biomedical Materials		
Organiser's remarks/suggestions	Maybe the reduction in the number of sessions could produce a more selective set of oral presentations.		

Symposium F14 Mechanical characterization and modeling of tissues and biomedical materials at all length scales

Organiser and co-organisers	Christian Hellmich (AUT), Lorenza Petrini (ITA), Pasquale Vena (ITA)		
Organiser's scientific comments	*not available*		
Contributions	Oral lectures: 24	Posters: 10	cancelled Oral: 6
Attendance in sessions	Average : 25	max 40	
Publication of selected papers	Computational Methods in Engineering Sciences		

Topic G1 Education (Maria Dolors Baró, ESP, Livio Battezzati, ITA)

Symposium G11 Material Science and Engineering Education for 2020s

Organisers	Maria Dolors Baró (ESP), Livio Battezzati (ITA)
Brief report and Organisers' comments	Prof. **P. Fernández** Dept. Física de Materiales of the University Complutense, Madrid, Spain: "**The power of board games to teach Materials Science**". The speaker claimed that games can be used in different moments of the term to reinforce some of the concepts in a more pleasant and original way, promoting the active participation of the students. During the presentation several examples were shown. This initiative was received with interest and a lively discussion ensued. Prof. **W. Paulus**, Université of Montpellier, France: ERAMUS MUNDUS programme **MaMaSELF: a EMMC connecting Universities, Industries and Large Scale Facilities.** The talk presented a new European Master Course in Materials Science consisting of a consortium of the Universities of Munich, and Universities of Torino and Rennes 1, with associated partners in Japan (Kyoto University), India (IIT Madras) and Switzerland. The novelty of this course lies in its close connection with European Large Scale Facilities and Industry. The talk highlighted the role played by EMMC in enhancing the employment and career chances of enrolled students between industrial needs and scientific excellence. The talk was highly appreciated, and many questions were asked Prof. **Y. Bréchet**, Grenoble INP, France: **"Attracting students to materials science via research projects**". In order to attract students to materials science degrees, the speaker put forward his experience in. using projects of initiation to research on everyday life phenomena, for which the students are invited to exert their creativity, via experiments and modeling. The presentation was followed by a warm discussion. Some other participants underlined that the lack of students willing to follow a Materials Science and Engineering was general in many developed countries Dr. **Ch. E. Lekka** from the, Department of Materials Science and Engineering, University of Ioannina gave a talk entittle: **"Towards an Education for Balanced Gender Career Evolution in Materials Science and Engineering Institutions".** Her talk highlighted the fact that in the Materials Science and Engineering field, career evolution is gender dependent with significant deviations at the topmost positions for all countries. The importance of working toward providing women friendly role models was stressed. The presentation was received with interest. Prof. **E. Ferrié** from Grenoble INP, talked about "**Teaching Materials Science for Nuclear Engineering**". After de disaster of Fukushima Daiichi plant, the subject was very appealing and the delegates were very interested in details. Some questions were asked. **EUROMAT Education survey.** The 2009 survey was used for the EUROMAT 2011 and a comparative study planned. However, due to the small number of answers received (85/2100) we decided to abort the study and as a consequence the presentation was cancelled. **The Round Table** entitled "**Is the Current Materials Science Educationfar from the Industry Needs?**" was organized by Prof. Livio Battezzati (Università di Torino) and Prof. Maria D. Baró (Universitat Autònoma de Barcelona) and chaired by Dr. Eva Pellicer (Universitat Autònoma de Barcelona). High-profile speakers coming from different areas (academia, industry, representatives of materials societies…) contributed to the Round Table. Dr. Bruno Dubost (from Industry), Prof. Paloma Fernández (from materials research institution), Prof. Werner Paulus and Prof. Yves Brechet (from the University of Montpellier and the INP of Grenoble respectively), and Prof. Pedro Portella (President of the Federation of European Material Societies –FEMS) amongst others, discussed the skills that materials science graduates and PhD's should have to meet the needs of materials-oriented industries. It was unanimously agreed that a strong background in materials science and engineering is essential. Representatives from industries pointed out that open-minded employees who demonstrate *adaptation* to both changes in the workplace and to the demands of the market are highly valued. The importance of having laboratories where people from academia and industry can work together for some time was highlighted. This would definitely serve to stimulate collaborative research and exchanging of ideas between academia and industry. A few attendants to the Round Table also gave their views on this issue based on their personal experiences. *Quality of discussion:* very good
Contributions	Oral lectures: 5 + survey analysis + round table
Attendance	Average : 40 max 70
Organiser's remarks/suggestions	The total number of contributions received as well as the number of participants (no higher than 70) was really very small compared to 2700 abstracts and 2100 delegates. This is something to be considered for future events.