

Report activities Commission of Physics of Minerals

2015

Sessions in Scientific meetings.

JOINT ASSEMBLY AGU-GAC-MAC-CGU, 3-7 May

Perovskites into the Next Millennium

Convenors: Catherine McCammon (University of Bayreuth), Anton Chakhmouradian (University of Manitoba), Patrick Woodward (Ohio State University) and Razvan Caracas (ENS Lyon)

New developments involving the perovskite structure and its many minerals and related phases continue to proliferate, among them the formal naming of the Earth's most abundant phase ("bridgmanite") found in the Tenham meteorite and the sky rocketing efficiency of perovskite solar cells. Structural modifications, crystal chemistry, phase relations, magnetism, physical and thermodynamic properties of perovskite and related structures continue to play an important role in processes occurring on the Earth and other planets. We invite contributions on all of these topics from field studies, experimental investigations and the computational community.

26th IUGG GENERAL ASSEMBLY, 22 June - 2 July

Physics and Chemistry of Earth and Planetary Interiors with Implications for their Structure, Process and Evolution

Convenors: Catherine McCammon (University of Bayreuth), Jihua Chen (Florida International University), Ian Jackson (ANU), Sergio Speziale (GFZ), Tomoo Katsura (University of Bayreuth), Joshua Feinberg (University of Minnesota), Anne Pommier (ASU), Tilman Spohn (DLR), Ralf Greve (Hokkaido University), Michael Purucker (NASA), Catherine Constable (Scripps), George Helffrich (Bristol University), Gregory Housemann (University of Leeds)

Advances in understanding the structure and evolution of the Earth's interior typically involve a combination of insights from field-based observations, the laboratory, and modeling. An interdisciplinary symposium is planned, involving new results from seismological and electrical sounding of the structure of the mantle and core (including discontinuities, anisotropy and attenuation), observations of the Earth's magnetic field and its relationship to planetary heat-flow, related earth materials research (including phase equilibria, element partitioning, deformation and the development of texture, and the influence of volatiles on partial melting, seismic and electrical properties, and rheology), and numerical modeling of properties and processes on scales ranging from the atomic to geodynamic, and from accretion and core formation to the present.

AGU FALL MEETING

Structure, dynamics and properties of silicate melts and magmas

Convenors D. Di Genova, D.R. Neuville, G.S Henderson

Physical and thermodynamic properties of silicate melts and magmas are key factors governing petrological and volcanic processes such as melt generation, transport, emplacement, crystallization, degassing and eruptive style. Studying the variation of these properties as a function of chemical composition and volatile content in silicate liquids is a fundamental task to better understand the dynamics of volcanic systems and to produce numerical models for the mitigation of volcanic risks.

The purpose of this session is to describe the current state of art in our knowledge of physical and thermodynamic properties of silicate melts. For these reasons, we welcome contributions applying experimental, theoretical, numerical and innovative approaches for understanding the structure, dynamics and properties of magmas and silicate glasses and melts.

CPM business meeting at the Goldschmidt in Praha :

Discussion about next sessions in scientific meetings, and about the possibility to organize a special issue for the 40th birthday of the Physics and Chemistry of Mineral Journal. Discussion with Nancy Ross, Catherine McCammon, Eiji Ohtani, Razvan Carracas, T. Inoue and D.R. Neuville about topics. Possible topics and chapters: Simulations, Molecular dynamic and non molecular dynamic, Core, Surface, Chemical reaction at atomic scale, Surface processes up to core processes, Ice giant, satellite. Need to discuss in more detail during next AGU meeting in San Francisco during the MRP meeting, but the discussion wasn't productive, and we need to make a further discussion during next meeting in Yokahama next year.

2016

Goldschmidt 2016, Yokomama, 26 June-1 July

Goldschmidt Theme: Mineralogy and Mineral Physics

Chair: Catherine McCammon (Bayreuth, Germany). Co-chairs: Masaki Akaogi (Gakushuin University, Japan), Matthew Kohn (Boise State, USA)

Minerals are the main building blocks of all that is solid in the known universe. They are sensitive to physical, chemical, and biological processes and are hence the primary recorders of past history on Earth, the planets and beyond. Mineral structures, chemistry and properties hold the key to deciphering the nature of the Earth and planets and the processes that made them what they are today as well as what they may become in the future. Sessions in this theme showcase recent developments that span the range of experimental, theoretical and field studies in mineralogy, crystal chemistry and mineral physics of both natural and synthetic phases.

Session Title: Glasses and Melts: From Volcanos to Laboratory

Convenors: Daniel R. Neuville, Roberto Moretti

Information concerning the structure and properties of silicate glasses and melts is indispensable for quantitative descriptions of glass making and also magmatic processes and modelling the differentiation processes of "magma oceans" in the early Earth. This session is intended to bring together the latest research reports on the structure and physical/thermodynamic properties of silicate glasses and melts. The topics may include, but are not restricted to: i) spectroscopic studies of the structures of silicate glasses and melts using techniques such as NMR, IR, Raman and EXAFS; ii) experimental measurements of physical properties, such as viscosity, density, diffusivity, and elemental partitioning; iii) computational studies such as molecular dynamics simulations and ab initio calculations.

Session Title: Mineral Physics of the Earth's Interior: Constraints on the Chemistry and Physics of our Planet from Experimental and Computational Studies

Convenors: Catherine McCammon, Razvan Caracas, Ryosuke Sinmyo, Vincenzo Stagno, Tetsuya Komabayashi, Jun Tsuchiya, Xianlong Wang

Recent progress on the physics and chemistry of crystal structures at extreme conditions as well as extraordinary advances in computational material science techniques such as first principles calculation methods provide new insight to geochemical and geophysical problems, for example that the deep Earth may host novel oxides, silicates and carbonates whose stability relations can influence geophysical observables and geodynamics of the Earth's mantle at variable depths. The direct correlation between crystal structure and electronic state of transition elements dominantly controls the elasticity, transport properties and element partitioning of the mineral phases under pressure. In addition, the recent finding of new iron-bearing oxides with exotic stoichiometry implies a re-evaluation of possible redox equilibria and, in turn, melting relations within mantle assemblages. This

session invites contributions on 1) the chemistry and physics of minerals under high pressures and high temperatures based on both experimental and theoretical studies, 2) electronic state and its effect on physical properties, 3) redox equilibria within terrestrial assemblages involving new phases and available thermodynamic data, 4) geodynamic and ab initio modelling as a tool to provide insight into the deep Earth and provide guidance for future research in mineral physics. We encourage discussions of methodological development toward better modelling of geochemical and geophysical processes such as isotope fractionation, the determination of transport properties, and so on.

EMC2016 Rimini 11-15 September

Session Title: "News from the deep Earth and beyond".

Conveners: P. Comodi (Università di Perugia, Italy), C. McCammon (University Bayreuth, Germany), T. Inoue (Ehime University, Japan).

Description: How the Earth's engine works and how it may evolve in the future depends on the nature of minerals and related phases at depth and their response to changes in pressure, temperature, fluid compositions and so on. The knowledge of HP-HT mineral physics is hence fundamental to our understanding of properties and processes within the Earth's interiors and more generally for the study of planetary bodies. This session will present a snapshot of current research, particularly focusing on experimental results of both natural and analogue phases that shed new light on our understanding of the Earth and planetary interiors.

A proposition from the CPM of IMA to organize a Magma and melts under extreme conditions, by Danilo Di Genova (Munich), Simon C. Kohn (Bristol) and Daniel R. Neuville (Paris) was rejected by the president of the french mineralogical society (SFMC).

CPM business meeting at the Goldschmidt in Yokohama: 28 June

1) The discussion about the possibility to make a special issue for the 40th birthday of the Physics and Chemistry of Mineral Journal continued with C. McCammon, T. Inoue, R. Moretti, E. Ohtani, D.R. Neuville. Several topics are listed and need to be discussed during next meeting in Rimini during EMC, in September.

Recent developments for

- Synthesis methods
- Numerical simulations (MD, first-principles calculation, etc.)
- Extreme condition experiments (high pressure, high temperature, etc.) ,
- Analysis methods
- Physical properties measurements
-

Which can be the 2 guest editors? What topics do we choose?

CPM business meeting at EMC2016 in Rimini:

Next 11 September 2016 3:30-5:00

Order of Business:

1) activities for next IMA meeting:
Session proposals for coming IMA

2) Activities for other meetings and conferences related to CMP.

2017 JpGU-AGU joint meeting Chiba, Japan 20-25 May 2017 Goldschmidt Paris 13-18 August 2017 EMPG?

3) Special Issue 40th birthday of the Physics and Chemistry of Mineral Journal.
Definition of Topics and Guest editors

Member and CPM structure.

Daniel R. Neuville (Chair), IPGP.

Toru Inoue (Vice Chair) GRC

Paola Comodi (Secretary), University of Perugia

Sub-commissions

Earth deep interior:

C. McCammon (Chair, BGI, Uni. Bayreuth), B. Reynard (Vice chair ENS Lyon), J. Bass (Illinois Univ.), Paola Comodi. T. Inoue, E. Ohtani (Tohoku Univ.),

Spectroscopy, diffraction, and new instrumentations in mineral physics:

E. Ohtani (Chair, Tohoku Univ), L. Dubrovinsky (Vice Chair: BGI, Univ Bayreuth), D. Shim (Vice-chair MIT), Francesco Di Benedetto, (Dept. Chemistry, Univ. Firenze), T. Irifune (GRC, Ehime Univ), M. Murakami (Vice Chair: Tohoku Univ), G. Amthauer (Dept. Material Engineering and Physics, Salzburg Univ.), S. Schorr (Berlin Free University),

Glass and melt studies and their applications to geosciences and industry:

G.S. Henderson (Chair: Depart. Geology, Univ. Toronto), A. Suzuki (Vice-chair, Tohoku Univ.), Sun-Keun Lee (Vice-chair, Seoul Univ.), Roberto Moretti (Second University of Naples), H. Behrens (Institute for Mineralogy, Univ. Hannover): D. Neuville (IPGP),

Theoretical and computing mineral physics :

R. Caracas (Chair: ENS Lyon); T. Tsuchiya (Vice-chair: GRC, Ehime Univ.), Mauro Prencipe (Univ. Turin), Bijaya B. Karki (Louisiana State University)

Jun Tsuchiya (GRC, Ehime Univ.)
B.B. Karki (Louisiana State University)

List of Officers (Commission and sub-commissions) and National Representatives (2010-2014): 17 members

Daniel NEUVILLE (Chair), IPGP
Toru INOUE (Vice chair), GRC, Ehime University
Paola COMODI: (Secretary) University of Perugia; Italy
Michael GAFT, Laser Detect Systems, Israel,
Nancy ROSS, Virginia Polytechnic Institute and State University,
Eiji OHTANI, Tohoku Univ.;
T. YAMANAKA, past president of IMA, GL, CIW;
C. McCAMMON, BGI, Univ. Bayreuth;
G. S. HENDERSON , Depart. Geology, Univ. Toronto;
H.BEHRENS, Institute for Mineralogy, Univ. Hannover;
L. DUBROVINSKY, BGI, Univ. Bayreuth;
D. SHIM, Arizona State Univ, USA
F. DI DENEDETTO, Dept. Chemistry, Univ. Firenze;
R. MORETTI, UNINA, Napoli, Italy
T. IRIFUNE, GRC, Ehime Univ.;
R. CARACAS; ENS Lyon;
T.TSUCHIYA, GRC, Ehime Univ;
G. AMTHAUER: Dept. Material Engineering and Physics, Salzburg Univ;