



Curtin University

THE INSTITUTE FOR
GEOSCIENCE RESEARCH (TIGeR)

2019 TIGeR CONFERENCE

Pathways towards equilibrium
in geological systems

11–13 September, 2019
Curtin University, Perth
PROGRAM

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2019 TIGeR CONFERENCE

Pathways towards equilibrium in geological systems
– mechanisms, length scales and microstructures

The aim of this 3-day conference is to promote progress at the leading edge of this topic through presentations and open-forum discussion.

We will focus on questions related to mechanisms of mineral and rock equilibration from the Earth's surface to the deep crust, including:

- *Crystallization and re-equilibration in aqueous solutions and its consequences*
- *Re-equilibration in crustal rocks and drivers towards equilibrium: a question of spatial scale?*
- *Are metamorphic rocks non-equilibrium self-organised systems?*
- *What mechanisms are available for the re-equilibration of a mineral assemblage?*
- *What can we learn from mineral microstructures and rock textures?*
- *Mineralization patterns and ore deposits as non-equilibrium phenomena*
- *Open and closed systems*

The total number of participants will be limited to about 80-100, to facilitate active participation and open discussion. So register early to avoid disappointment.

THE AGENDA

The aim is to have short presentations (20 + 10 minutes for keynote speakers, 10 + 5 minutes for other talks) focusing on specific issues for later discussion. Poster sessions throughout the conference will provide further discussion time. The detailed schedule will be sent out after the registration period.

DETAILS

REGISTRATION & ABSTRACT SUBMISSION

Please go to the website

<http://tiger.curtin.edu.au/conferences/>
and follow the links.

VENUE

The Exhibition Area, Building 500,
Curtin University, Bentley Campus, Perth.

ACCOMMODATION

Most of the large chain hotels are in the City and there are public transport options (buses) to Curtin. There are also many Airbnb opportunities nearer to Curtin. Further details will follow for registered participants.

CONTACT

Email: Andrew.Putnis@curtin.edu.au

Speakers include:

Lukas Baumgartner (Lausanne, Switzerland)
Andreas Beinlich (Curtin, Australia)
Shuyun Cao (Wuhan, China)
Damien Daval (Strasbourg, France)
David Dolejs (Freiburg, Germany)
Katy Evans (Curtin, Australia)
Matt Fantle (Penn State, USA)
Andrew Friedrich (Monash, Australia)
Silvia Frisia (Newcastle, NSW)
Julian Gale (Curtin, Australia)
Juan Manuel Garcia Ruiz (Granada, Spain)
Denis Gebauer (Konstanz, Germany)
Thorsten Geisler (Bonn, Germany)
Marguerite Godard (Montpellier, France)
Martin Hand (Adelaide, Australia)
Bruce Hobbs (CSIRO, Australia)
Benjamin Malvoisin (Grenoble, France)
Klaus Mezger (Bern, Switzerland)
Eric Oelkers (UCL, UK)
Christine Putnis (Münster, Germany)
Encarni Ruiz-Agudo (Granada, Spain)
Tracy Rushmer (Macquarie, Australia)
Aleksey Sadekov (UWA, Australia)
Carl Spandler (James Cook, Australia)
Simon Turner (Macquarie, Australia)

SPONSORS



ORAL PRESENTATIONS

WEDNESDAY 11 SEPTEMBER

9.00 – 9.30am
REGISTRATION and TEA/COFFEE

WELCOME

Chris Moran

Deputy Vice-Chancellor (Research)

9.30 – 9.45

Andrew Putnis

Introduction to the 2019 TIGeR Conference

9.45 – 10.15

Denis Gebauer

Predicting Aqueous Mineral Phase Behaviour based on Non-Classical Nucleation Theory

10.15 – 10.45

Ruiz-Agudo, E., Putnis, C.V., Kudłacz, K., Cizer, O., Elert, K., Burgos-Cara, A.

Calcite formation and growth via amorphous calcium carbonate nanoparticles

10.45 – 11.15

Natalya A. Garcia, Alicia Schuitemaker, Emily H. Byrne, Alessandro Silvestri, Marco De La Pierre, Raffaella Demichelis, Paolo Raiteri, Julian D. Gale
Crystallisation of biominerals: What can computation tell us?

11.15 – 11.45

Sylvain Bernard, Damien Daval, Philippe Ackerer, Sylvain Pont, Anders Meibom

Burial-induced oxygen-isotope re-equilibration of fossil foraminifera: experimental evidence and possible impacts on paleotemperature reconstructions

11.45 – 12.15

Matthew S. Fantle, Piyali Chanda, Christopher Gorski, Rosemary Oakes

Experimental investigation of the short-term exchange of foraminiferal calcite: Implications for the nature of diagenetic imprints on the geochemical proxy record

12.15 – 13.15 LUNCH

13.15 – 14.15 DISCUSSION/POSTER SESSION

14.15 – 14.45

Juan Manuel Garcia Ruiz

To be confirmed

14.45 – 15.15

Eric Oelkers

The kinetics of isotope exchange during ambient temperature water-mineral interaction

15.15 – 15.30

Christine V. Putnis, Encarnación Ruiz-Agudo
Dynamic equilibrium during calcite-water interactions

15.30 – 16.00

Aleksey Sadekov, Luke Skinner, Margaux Brandon, Christine Veta Putnis, Malcolm McCulloch
Effect of dynamic equilibrium on REEs geochemistry of deep-sea carbonates and its implication for REEs budget in the oceans

16.00 – 16.30

Silvia Frisia, Mihály Pósfai, Andrea Borsato
Crystallization processes in carbonate archives of climate change

16.30 – 17.00 COFFEE/TEA BREAK

17.00 – 17.15

J. Aufort, C. Gervais, L. Segalen, E. Balan
Dissolution-recrystallisation of bone in natural environments and controlled diagenesis experiments

17.15 – 17.30

N.A. Garcia, R. Demichellis, C.V. Putnis, P. Raiteri, J.D. Gale
Crystallographic Control of Apatite Mineral Dissolution

18.00 BARBEQUE OUTSIDE BUILDING 312 (GEOLOGY)

THURSDAY 12 SEPTEMBER

9.00 – 9.30

Baumgartner L.P., Bégué F., Adams A., Cisneros-Lazaro D., Meibom A., Guo J., Daval D., Bernard S., Baronnet A., Grauby O., Stolarski J.

SIMS investigations of recrystallisation of and diffusion in carbonate at low and high temperature

9.30 – 10.00

Thorsten Geisler, Christoph Lenting, Lars Dohmen, Michael Sulzbach

Real-time, in situ investigations of solid-fluid reactions by fluid-cell Raman spectroscopy

10.00 – 10.30

Andrew J. Friedrich, Denis Fougereuse, Scarlett C. Southall, Steven M. Reddy, David W. Saxey

Iron Oxide Recrystallization Mechanisms Captured by Atom Probe Analysis of Isotopic Tracers

10.30 – 11.00 COFFEE/TEA BREAK

11.00 – 11.30

Evans, K.A., Powell, R.

When is an equilibrium thermodynamic approach applicable?

11.30 – 11.45

Alok Chaudhari, Joel Brugger, Andrew Friedrich, Rahul Ra, Barbara Etschmann, Allan Pring, Paul Guagliardo

Crystallization and re-equilibration in copper-sulfides – insights from the mineral replacement of chalcopyrite by digenite/covellite

11.45 – 12.00

Scarlett C Southall, Steven Micklethwaite, Andrew J Friedrich

Effect of Metal Substitutions (Al, Ni) on Fe(II)-Catalysed Recrystallisation of Goethite

12.00 – 12.15

Lisa Tannock, Marco Herwegh, Alfons Berger, Klaus Regenauer-Lieb

Processes and Mechanisms of Giant Quartz Reef Formation. Part 1: Observations

12.15 – 12.30

Klaus Regenauer-Lieb, Marco Herwegh, Alfons Berger, Lisa Tannock

Processes and Mechanisms of Giant Quartz Reef Formation. Part 2: Model of the Dynamics

12.30 – 13.30 LUNCH

13.30 – 14.30 DISCUSSION/POSTERS/VISIT TO JdL CENTRE

14.30 – 15.00

Klaus Mezger, Jonas Pape

Reprocessing of Chondrules during Early Solar System Evolution

15.00 – 15.30

Stephanie Kovach, Tracy Rushmer, Sandra Piazzolo, Simon Turner

Different modes and time-lines of alteration in carbonaceous chondrites

15.30 – 16.00

Simon Turner, Michael Turner, Lucy McGee, Trevor Ireland

Studies of water on Earth and in the asteroid belt

16.00 – 16.30 COFFEE/TEA BREAK

16.30 – 17.00

Carl Spandler, Hugh St.C. O'Neill

Rare Earth Elements in olivine: A litmus test for diffusion studies?

17.00 – 17.15

Alison Ord, Bruce Hobbs

A Nonlinear Theory of Structures in Layered Intrusions

18.00 BUS TO THE BOATSHED RESTAURANT FOR THOSE SIGNED UP FOR THE DINNER

FRIDAY 13 SEPTEMBER

9.30 – 10.00

Bruce Hobbs, Alison Ord, Stanislav Ulrich, Karel Schulmann

The influence of metamorphic reactions on localisation of deformation

10.00 – 10.30

David Dolejš

Physical and chemical dynamics of hydrothermal systems: non-linear interplay of transport, dispersal and reactivity

10.30 – 11.00 COFFEE/TEA BREAK

11.00 – 11.30

A.Beinlich, T. John, H. Vrijmoed, M. Tominaga, T. Magna, Y. Podladchikov

Timescale of mid-crustal fluid-mediated rock re-equilibration

11.30 – 12.00

Benjamin Malvoisin

Fate of fluid pathways during reaction in closed system

12.00 – 12.15

Yuan Mei, Weihua Liu, Joel Brugger

Probing Metal Transport in the Deep Earth Using Molecular Simulations

12.15 – 12.30

Margaret S. Boettcher, Pamela Moyer, Jessica Warren, Cécile Prigent, Arjun Kohli

Integrating Evidence from Peridotite Mylonites and Earthquake Stress Drops to Understand Slip on Oceanic Transform Faults

12.30 – 12.45

Steffen H. Büttner, Edmore Marima, Geoffrey H. Howarth

Equilibrium and disequilibrium crystallisation and melt segregation in kimberlitic melt inclusions from Monastery mine, South Africa

12.45 – 14.30 LUNCH/DISCUSSION/POSTERS

14.30 – 15.00

M. Godard, S. Escario, S. Peuble, P. Gouze

Serpentinization and carbon trapping in peridotite basements: New insights from reactive percolation experiments

15.00 – 15.30

Shuyun Cao, Franz Neubauer, Meixia Lv

Graphitic material in fault zones: Implications for fault strength and carbon

15.30 – 16.00 COFFEE/TEA BREAK

16.00 – 16.15

Eleanore Blereau, Chris Clark, Pete Kinny, Richard Taylor, Tim Johnson, Eleanor Samson, Martin Hand

Using rare earth elements in zircon to investigate the thermal history of a UHT terrane

16.15 – 16.30

Ruairidh J. Mitchell, Tim E. Johnson, Katy Evans, Saibal Gupta, Chris Clark

Protolith heterogeneity, melt loss and the development of microstructures in granulites

16.30 CLOSING DISCUSSION

POSTERS

MG ISOTOPES TRACE THE CARBONATION OF ULTRAMAFIC MINE WASTE

Hans C. Oskierski, Connor C. Turvey, Siobhan A. Wilson, Bogdan Z. Dlugogorski, Mohammednoor Altarawneh, Vasileios Mavromatis

STRESS ORIENTATION-DEPENDENT REACTIONS DURING METAMORPHISM

Jo Moore, Andreas Beinlich, Håkon Austrheim, Andrew Putnis

CHLORO-HYDROXY-ZIRCON NANOPRECIPITATES FINGERPRINT FERTILITY AND MINERALIZATION POTENTIAL OF GRANITIC MAGMAS

Liam Courtney-Davies, Cristiana L. Ciobanu, Max Verdugo-Ihl, Ashley Slattery, Nigel J. Cook, Kathy Ehrig

'INVISIBLE' AU IN PYRITE FROM OLYMPIC DAM DEPOSIT, SOUTH AUSTRALIA: BRIDGING TEXTURES WITH STATISTICAL ANALYSES

Marija Dmitrijeva, Max R. Verdugho-Ihl, Kathy J. Ehrig, Cristiana L. Ciobanu, Nigel J. Cook

OSCILLATORY GROWTH PATTERNS IN HEMATITE DEFINED BY SI-FE-NANOPRECIPITATES: ORE ENRICHMENT PROCESSES IN BIFS

William Keyser, Cristiana L. Ciobanu, Max Verdugo-Ihl, Nigel J. Cook, Ashley Slattery, Kathy Ehrig

NATURAL AND SYNTHETIC ALUMINIUM-PHOSPHATE-SULPHATES UNDER ACID LEACH CONDITIONS: PATHWAYS TO RADIONUCLIDE REDUCTION IN COPPER PROCESSING CIRCUITS

Nicholas D. Owen, Nigel J. Cook, Rahul Ram, Joël Brugger, Mark Rollog, Kathy J. Ehrig, Danielle S. Schmandt, Cristiana L. Ciobanu, Benjamin P. Wade, Paul Guagliardo

SHEAR HEATING DURING EXHUMATION: AN EXAMPLE FROM THE NORDFJORD-SOGN DETACHMENT, HYLLESTAD, NORWAY

Sean Makin, Chris Clark, Tim E. Johnson, Andrew Kylander-Clark, Martin Hand

NANOSCALE INVESTIGATION OF DEEP, METAMORPHIC FLUID

Tommaso Tacchetto, Steven M. Reddy, Chris Clark, David Saxey

THE FATE OF PRIMARY FLUID INCLUSIONS IN PERITECTIC GARNETS FROM THE LOWER CONTINENTAL CRUST

Bruna B. Carvalho, **Tommaso Tacchetto**, Omar Bartoli, Bernardo Cesare, Omar Gianola, Fabio

EVIDENCE FOR RESUBDUCTION OF LAWSONITE-ECLOGITE DURING RETURN FLOW, SOUTHERN NEW ENGLAND OROGEN, AUSTRALIA

Tamblyn, R., Hand, M., Morrissey, L., Zack, T., Phillips, G., Anczkiewicz, R.

NON-EQUILIBRIUM AND EQUILIBRIUM SULPHIDE CRYSTALLIZATION IN MODERN SEAFLOOR HYDROTHERMAL SULPHIDE CHIMNEYS

Si-Yu Hu, Steve Barnes, Anais Pages, Joanna Parr, Ray Binns

TUNGSTEN-BEARING NANOPARTICLES IN HEMATITE: INSIGHTS INTO OPEN SYSTEM BEHAVIOUR OF MINERAL GEOCHRONOMETERS

Max R. Verdugo-Ihl, Cristiana L. Ciobanu, Nigel J. Cook, Liam Courtney-Davies, Kathy Ehrig, Ashley Slattery



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