

A one day Symposium
Mineral Carbonation:
Large scale, safe, and permanent storage of carbon dioxide
Hosted by Orica Mining Services and the University of Sydney
12 March 2012
Woolcott Centre, 431 Glebe Point Rd, Glebe, Sydney, 2037.

Mineral carbonation presents a compelling case for the large scale, safe, and permanent storage of carbon dioxide from industrial processes. It happens in nature, but slowly, where it is called “rock weathering”. Its products are benign, and the global capacity of suitable feedstocks for mineral carbonation could sequester all anthropogenic emissions of CO₂ for several hundred years. Can we make it happen faster? Can we develop commercial processes at scale, and fast enough? What would this cost? How does this technology sit alongside other mitigation options for climate change impacts from CO₂ emissions?

To date, the topic of CO₂ storage has been dominated by geosequestration – the physical storage of compressed gas in underground reservoirs and saline aquifers. However, the deployment of geosequestration has been much slower than anticipated, and there remain many unanswered questions about the genuine extent of its likely contribution to mitigating climate change impacts.

This symposium will address two key questions, among others:

- “Under what conditions could mineral carbonation be a technically, and economically viable option for carbon storage for point source emissions of CO₂?”
- “What could this mean for the transformation of Australia to a low-carbon economy?”

These are pertinent questions. For example, suitable land-based geosequestration options do not exist in NSW and eastern Queensland – two major sources of coal-based power generation. And the recent passing of a carbon tax in Australia has provoked strong reaction. Energy intensive industries are working to understand the implications of such a tax and its evolution to a carbon trading scheme in due course, and to secure their own positions.

This symposium will present the technical and business case for mineral carbonation as part of a multi-scale approach to carbon management, to support this important economic transformation to a low carbon economy.

Who should attend:

Global research and development of mineral carbonation technologies has now matured to the point where it is possible to state with some confidence under what conditions this carbon storage option is feasible from a techno-economic standpoint, and to ask what this means in terms of overall carbon management of energy-intensive industries. Research findings, both generally and in the current Australian context, are positive and exciting.

This symposium has brought together some of the global leaders in this field from research, development, and commercialization. It will provide regional perspectives from the USA, Europe and South-East Asia, as well as an Australian focus. It is also a unique opportunity to engage our eminent speakers in an informal setting.

This not-for-profit symposium will be of interest to a wide audience, including policy makers, investment analysts, industry and business leaders, researchers and advocacy groups. It aims to both lay out the opportunities and challenges, and to elicit wider support for this approach to carbon storage. Its relevance crosses many sectors, including coal and iron, power generation, mining and minerals, chemical process industries, engineering, construction, transport, infrastructure and others.

The programme will include:



The global imperative of secure carbon storage and the underlying rationale for mineral carbonation, including future directions

Klaus Lackner, the Maurice Ewing & J. Lamar Worzel Professor of Geophysics, Chair, Department of Earth and Environmental Engineering, Director, Lenfest Center for Sustainable Energy, Columbia University NY, USA

Klaus is acknowledged as the pioneer of mineral carbonation, having started research in this field while at Los Alamos National Laboratories in the 1990s. He was lead author for the IPCC Report on Carbon Capture and Storage, and his current research interests include carbon capture and sequestration, air capture, and energy systems and scale-up.



Process routes for the large-scale carbonation of natural minerals and steelmaking slags - a European perspective

Ron Zevenhoven, Professor Engineering Thermodynamics and Modelling, Åbo Akademi University, Turku, Finland

Ron has been working on magnesium silicate rock carbonation since 2000, as well as on carbonation of steelmaking slags since 2005. Both process routes are in a transition from lab-scale to demo-scale in industry. He was also a lead author for the IPCC Report on Carbon Capture and Storage.



The NETL aqueous mineralization process: recent developments and novel applications

William O'Connor, Geologist, National Energy Technology Laboratory (NETL), Office of Fossil Energy, US Dept. of Energy, Albany, OR, USA

Bill pioneered the development of the NETL aqueous process for mineral carbonation, which is considered to be the benchmark and one of the most promising routes for large scale mineral carbonation of suitable feedstock ores.

He has continued to work on mineral carbonation, including alternative feedstock materials such as iron & steel industry wastes and coal ash. He has also investigated the potential for in situ mineral carbonation (mineral trapping) in basalt-hosted saline formations.



Near-ambient carbonation process with economic extraction of mineral by-products - a Singapore perspective

Paul Sharratt, Professor & Programme Manager Process Science and Modelling, Singapore Institute of Chemical and Engineering Sciences (ICES), Singapore

Paul is a chemical engineer who has worked in industry and academia. At the Institute of Chemical and Engineering Sciences in Singapore he manages work spanning process innovation, scale up, analytical techniques and modelling. He leads a team involved in several projects in Singapore's carbon capture and utilization research programme.



The process engineering challenges and the minerals connection

Jim Petrie, Emeritus Professor, School of Chemical and Bio-molecular Engineering, University of Sydney, Australia

Jim's research and consulting over the last 25 years has focused on system-wide sustainability assessments, technology development and commercialisation, decision support and life cycle management for primary industries and infrastructure sectors. His work on mineral carbonation is aimed at unlocking its potential within coal-based power generation and minerals refining, with a focus on Australian and South African opportunities.



The Australian case for mineral carbonation: extending its reach to networks of minerals, power, and cement industries

Geoffrey Brent, Research Associate, Orica Mining Service, in collaboration with CSIRO, Australia

Geoff has extensive experience in blasting and mining and has introduced many successful innovations to these industries. For the past five years he has worked in the field of mineral carbonation, developing process flow sheets for large scale carbonation of CO₂ emissions from power generation and has extended these to include various industries in feasible industrial networks for the Australian cases of NSW and QLD.



The ICS integrated carbon capture and sequestration process

Richard Hunwick, Managing Director Integrated Carbon Sequestration Pty Ltd, Sydney, Australia

Richard is a chemical engineer whose focus over four decades of professional practice has been on reducing coal's environmental impacts, and more broadly, on the technologies involved in electricity generation and in metal refining and the production of other industrial commodities. He formed Integrated Carbon Sequestration Pty Ltd in 2007 to facilitate the development and deployment of the ICS mineral carbonation process, which he invented.

The symposium will conclude with a panel discussion involving all presenters. This discussion will reflect on the questions of the day, and explore prospects for advancing the role of mineral carbonation as part of a strategic approach to climate change mitigation.

An informal drinks reception will conclude proceedings for the day.

Registration:

Delegate: \$800

Early Bird before 1 Feb 2012: \$700

Student Concession: \$400

Early Bird before 1 Feb 2012: \$300

Discounts are allowed for members of associated engineering associations and institutes.

Please note that formal documentation will be made available in January

Register your interest in participating in the symposium by January 31, 2012 by contacting:
Skender Bregu
T +61 2 9351 5284
E skender.bregu@sydney.edu.au

For more information please contact the Symposium Chairman:
Professor Brian Haynes
T +61 2 9351 3435
E brian.haynes@sydney.edu.au