



INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES (IS-Geo)
KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES (KIGAM)

PUBLIC CUSTOMIZED TRAINING COURSE ON Geometallurgy and Advanced Characterization of Iron Ores

The **International School for Geoscience Resources** of KIGAM presents an intensive training course on **Iron ore geology, mineralogy, characterisation and importance of ore texture for prediction of down-stream processing**. The course will take place at the Mirinae room of International School for Geoscience Resources of KIGAM in Daejeon (Korea) in **September 15th to 16th, 2014** and will include the following topics.

Topics	Date	Instructor
Day 1. Iron ore geology, mineralogy and characterization Topic 1. Introduction to Iron Ore Geology and Mineralogy Topic 2. Different techniques for iron ore characterization Topic 3. Iron ore mineralogical and textural characterization Topic 4. Automated optical image analysis	Sep. 15	Sarath Hapugoda (CSIRO, Australia) & Eugene Donskoi (CSIRO, Australia)
Day 2. Iron ore/sinter characterization and importance of texture for prediction of downstream processing Topic 1. Importance of ore texture for prediction of downstream processing Topic 2. Magnetite ore characterization Topic 3. Ore and Gangue mineralogy and chemistry (Iron ore impurities) Topic 4. Iron ore sintering & sinter phase classification Topic 5. Comparative study of iron ore characterization using a scanning electron microscope and optical image analysis	Sep. 16	Eugene Donskoi (CSIRO, Australia) & Sarath Hapugoda (CSIRO, Australia)

COURSE INFORMATION

- **Agenda**

- This course will provide an introduction to Iron Ore Geology and Mineralogy, iron ore and iron sinter characterisation (especially optical image analysis) and importance of textural information for prediction of downstream processes.
- The participants will have an opportunity to compare different ore and sinter textures and expand their capabilities in ore/sinter characterisation.

- **Course Covered**

- Different mineralogical types of iron ore and sinter
- Different techniques for iron ore characterization
- Automated optical image analysis
- Importance of ore texture for prediction of downstream processing

- **Course Requirements: Prerequisite**

- General knowledge of chemistry, physics and mineralogy

- **Who should Attend?**

- Scientists and engineers working in all stages of downstream iron ore processing from exploration and mining till sintering and pelletising.
- Graduate students and advanced undergraduate students who would like to learn more about iron ore mineralogy and characterisation.

- **Summary of topic contents and learning objectives**

- **Day 1. Iron ore geology, mineralogy and characterization**

- Welcome and introduction (CSIRO and Carbon Steel Futures group)
- Introduction to Iron Ore Geology and Mineralogy
- Introduction to different techniques for iron ore characterization
- Introduction to iron ore mineralogical and textural types
- Automated optical image analysis, CSIRO software “Mineral4/Recognition4”
- Automated optical image analysis of iron ore, sinter, coke

- **Day 2. Iron ore/sinter characterization and importance of texture for prediction of downstream processing**
 - Importance of ore texture for prediction of downstream processing
 - Magnetite ore characterization
 - Ore and Gangue mineralogy and chemistry
 - Iron ore sintering & sinter phase classification
 - Comparative study of iron ore characterisation using a scanning electron microscope and optical image analysis
 - Mineral Liberation Analyzer analysis of iron ore, sinter, coke

About the instructor – *Dr. Eugene Donskoi*



Dr. Eugene Donskoi is a Senior research scientist of CSIRO and project Leader in Mineral Processing Modeling and Characterization. Dr. Eugene Donskoi received his PhD in Queensland University of Technology, Brisbane, Australia in 2000, and the thesis was “The Mathematical Modelling of Direct Reduction in Iron Ore/Coal Composites Including the Modelling of Coal Pyrolysis”.

Main areas of his research are as below:

- Development of optical image analysis system for coke, coal, iron ore and sinter characterisation which includes automated image acquisition and processing, automated ore and gang texture classification and calculation of mineral, chemical, dimensional, liberation and association ore characteristics.
- Coal and gas based direct reduction; Coal pyrolysis and gasification modelling.
- Effect of ultrasound on hematitic/goethitic iron ore fines.
- Hydrocyclone performance modelling and pilot trials; WHIMS and LIMS modelling
- Iron ore attrition during processing.
- Sinter properties modelling and optimization of ore blends from sinter quality point of view; Iron ore agglomeration modelling and data analysis; Iron ore pellet induration plant modelling.

And the projects which he is working on are as below:

- The Australian Coal Industry’s Research Program (ACARP): Optical image analysis of coke structure and the effects of structural parameters on coke strength;
- Australian Industry: Mineral and textural characterisation of compact sinter; Development, Installation and Support of Software Mineral4/Recognition4;

- CSIRO: Iron Ore characterisation Fundamentals; Sintering Fundamentals; Coal and Coke Fundamentals;
- International: Ultrasonic Treatment of Brazilian Iron Ores.

About the instructor – *Dr. Sarath Hapugoda*



Dr. Sarath Hapugoda is a Mineralogist/Geologist of CSIRO. He received his PhD(Geology) and MSc(Mineralogy) from University of Queensland in 2002 and from Shimane University, JAPAN in 1995, respectively. His research areas are Iron, Manganese and Ni-laterite ore characterisation. Iron and manganese sinter characterization/sinter phase analysis. And he is an author/co-author for 10 international publications, Author/co-author for over 50 CSIRO industry reports.

The projects which he is working on are as below:

- Effect of alumina on sinter performance
- Sinter Performance of new iron ore fines
- Characterisation (optical/SEM/EPMA) of magnetite concentrates
- Characterisation of goethite ores from NT, Australia
- Electron Probe Microanalysis (EPMA), Scanning Electron Microscope (SEM) and X-Ray Diffraction Analysis for the materials (Iron Ore, Sinter, slag, Coke, Coal) from Industry funded or Appropriation projects