9957 Integrating Steel Production with Mineral Sequestration

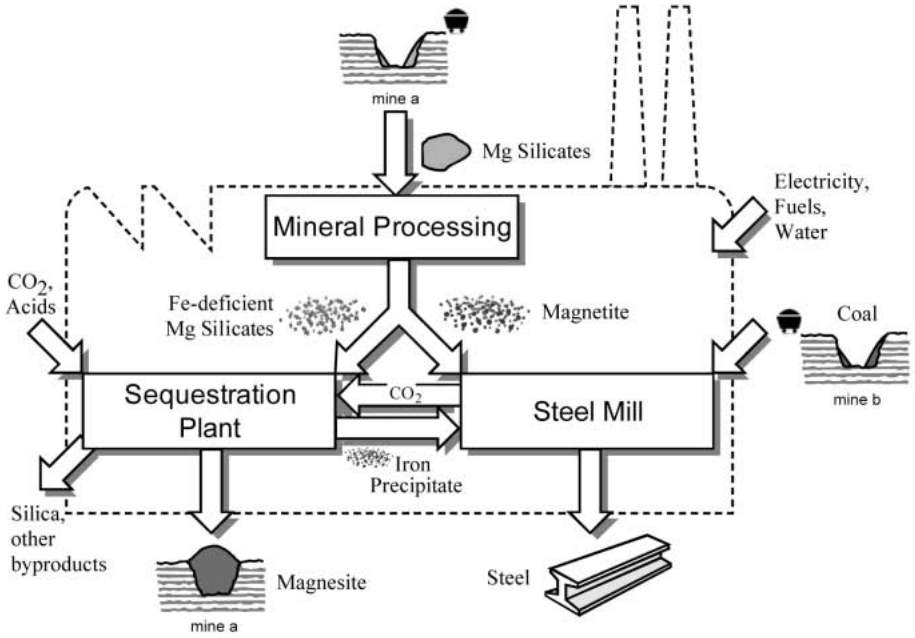
Benefits

- Significant reduction of CO_2 emissions.
- Develop a "carbon sink" within the steel industry and sell CO_2 disposal credits to other industries.
- Fe_2O_3 from peridotite ores.

Mineral sequestration, the disposal of carbon dioxide in the form of benign solid carbonate, provides a permanent and safe method of carbon dioxide disposal of virtually unlimited capacity. This method of carbon dioxide disposal could greatly benefit from a collaboration with the steel industry as the hydrometallurgical processing of the mineral ore (peridotite rock) results in the generation of virtually pure iron oxides. It will provide new sources of Fe_2O_3 from peridotite ores, sequester CO2 from the blast furnace and other combustion operations including power plants.

The US steel industry is accustomed to preprocessing iron ores prior to bringing them into the blast furnace. If the gangue materials could be used to chemically bind carbon dioxide then this would develop a niche market for the steel industry in which to dispose of its own carbon dioxide. For every ton of Fe produced at steel plants there is approximately a ton of carbon dioxide that will need to be sequestered as a result of iron reduction. Overall the steel making process is more carbon intensive and total CO_2 production per ton of steel is about 1.7 tons.

Integrated Mineral CO_2 Sequestration Plant/Steel Mill



Project Goal: To develop a combination iron reduction and carbon sequestration plant that will use serpentine ores as the source of iron and dispose of its own CO_2 -- plus additional CO_2 from other sources -- in the mineral tailings that are left at the end of the iron reduction process.

By using the same ore processing steps for carbon sequestration and iron ore production, we increase the value of the carbon sequestration process and consequently reduce the cost of sequestration with this added value.

Progress and Milestones

- ❖ Project start date: September 2005
- ❖ Characterization of rock formation: December 2006
- ❖ Develop magnetic separation techniques: December 2006
- ❖ Acid leaching of serpentine and peridotite rock: June 2007
- ❖ Recovery of acid: March 2007
- ❖ Integrate serpentine processing and iron concentrate production with steel mill operation: August 2007
- ❖ Project completion date: September 2007

Total Project Cost $350,211

Duration 2 years

Research Organization
Columbia University
New York, NY

Industry Participants
Dofasco Inc.
Hamilton, ON, Canada

Gallatin Steel
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Hylsa
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