This project aims to develop a process that improves the kinetics of the hydrous carbonate formation reaction enabling steelmakers to directly remove CO₂ from their furnace exhaust gas. It is proposed to bring the furnace exhaust stream containing CO₂ in contact with reclaimed steelmaking slag in a reactor that has an environment near unit activity of water resulting in the production of carbonates. These products are suitable for polymer fillers, agricultural and construction applications. In addition to the removal of CO₂, some sensible heat may be recuperated for process or plant services application. The CO₂ emissions from the plant would be reduced by the amount sequestered in the formation of carbonates. The main raw materials for the process are furnace exhaust gases and specially prepared slag.
**Project Goal:** To develop and demonstrate a process for sequestering CO₂ from steelmaking in either a BOF or EAF by forming carbonates with the alkaline earth component of used slag for beneficial reuse in other applications.

The kinetics and applicability of forming hydrous carbonates from used slag and exhaust gas will be studied on a bench and pre-pilot scale. In principle the product will be used to replace mined carbonate products for construction, agriculture and polymer product fillers.

**Progress and Milestones**
- Project start date: March 2005
- Industrial site application survey: May 2005
- Literature survey: June 2005
- Bench evaluation of kinetic factors and trace elements: May 2006
- Potential products system comparison: July 2006
- Construct bench-scale prototype: October 2006
- Evaluation of bench-scale system: February 2007
- Project completion date: March 2007

**Total Project Cost** $465,184

**Duration** 2 years

---

**Research Organization**
University of Missouri-Rolla
Rolla, MO

**Industry Participants**
- Dofasco Inc.
  Hamilton, ON, Canada
- Gallatin Steel
  Ghent, KY
- Hylsa
  San Nicols, Mexico
- Mittal Steel, USA
  Chicago, IL
- Ipsco
  Muscatine, IA
- Nucor
  Charlotte, NC
- Praxair
  Tonawanda, NY
- Timken
  Canton, OH
- US Steel
  Pittsburgh, PA

**For additional information,**
**Please Contact:**

**University of Missouri-Rolla**
Dr. Von Richards
vonlr@umr.edu

**American Iron and Steel Institute**
William Obenchain
wobench@steel.org