

Motivation/Challenges

Extending the service life of materials used in high temperature service environments is critical for industry as new products are developed, production processes become increasingly severe, greater process throughput is desired, and/or longer on-line performance of process containment materials is sought.

Technology/Capability Overview

Refractory liner materials have been identified as a barrier in gasification and other process technologies. Industry desires improved material performance to decrease repair frequency and time. This has been accomplished in gasification and steel industries by developing new or improved performance refractory liner materials or through better process control.

Refractory Development:

- Improved Cr_2O_3 refractory liner containing phosphates developed for slagging gasifiers
- Slag/refractory interactions in gasification systems with mixed carbon feedstock studied to control slag properties and refractory performance

Slag Management:

- Slag properties predicted using customized databases
- The impact of additives on slag properties and refractory performance evaluated
- Phase behavior in V_2O_5 containing slags studied
- Ash properties of mixed carbon feedstock studied
- MgO saturated EAF slag modeled, resulting in improved EAF slag properties and longer refractory service life

Industry Significance

New materials and improved process control have the potential for:

- Increasing refractory service life over currently used materials, thereby lowering process costs, particularly in gasification and steel production
- Improving gasifier reliability, availability, and decreasing system maintenance costs
- Predicting material performance in gasification systems with potential carbon feedstock or determining process conditions necessary for optimal system operation

Benefits to Partner

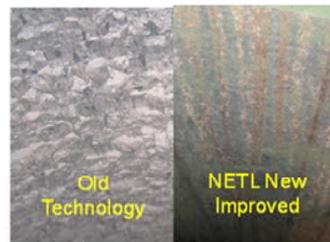
- Licensed refractory product technology to refractory manufacturer (Cr_2O_3 refractory containing phosphate additions)
- Proprietary customized process development
- Improved process understanding leading to better production environment control and/or raw material purchasing decisions
- Increased furnace output, resulting in lower cost of production

Opportunity

Seeking businesses to cooperate in the development of improved performance materials, better process controls, or improved slag management practices.

Development Status

- Licensed phosphate containing Cr_2O_3 refractory materials
- Patent application submitted on a new gasifier refractory material
- Patent application submitted to control the gasifier slag environment
- Evaluating stable high temperature phases in slags resulting from ashes in coal/petcoke carbon feedstock with varying concentrations of V_2O_5
- Developing slag management model for mixed coal/petcoke carbon feedstock ash
- Predicting additives to control refractory material wear and material interactions in gasification systems using coal and/or petcoke as carbon feedstock



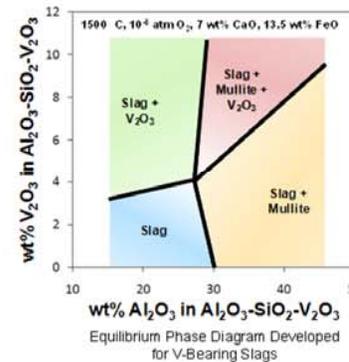
NETL Proved Refractory Technology in a Gasifier



NETL Refractory Demonstrates Improved Performance



MgO Saturated Foaming Slags for EAF Steel Melting



Contact

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