REFRACTORIES

Lightweight Refractory Can Improve Kiln Insulation Performance and Fuel Efficiency

Ever-widening end use application possibilities, allied to novel production techniques, have resulted in a higher strength version of a unique refractory insulating product. The particular product in question is manufactured by Mantec Refractories in Stoke-on-Trent in the UK. The company is a division within Mantec Technical Ceramics that has a historical pedigree going back over 50 years and was constituted in its current form in 2005.

EXPERT FORUM

Recycling Refractory Materials: Ambitions with a future?

In many industries there are efforts to establish a circular economy. In the refractory industry, too, there are research projects on the recycling of refractory materials. In our expert forum, two experts provide information on the state of research and development and give an outlook.

INTERVIEW

Carol Jackson: “I envision an environmentally responsible refractory product life cycle”

Carol Jackson, Chairman and CEO of HarbisonWalker International, has begun her two-year term presidency of the World Refractories Association in January 2020. She succeeds Stefan Borgas, CEO of RHI Magnesita, who has led the organization since January 2018. In an interview with the Interceram she talks about the environmental responsibility of the refractories industry and the role of refractories as an essential industry – especially in the current crisis.

INSULATION

High Temperature Insulating Materials Based on Renewable Raw Material

High temperature insulating materials are the hidden champions in multiple refractory lining applications. A typical main task is to decrease the thermal profile in the lining to protect the steel shell of the furnaces against overheating and to avoid energy losses. The present work gives an overview about different state-of-the-art materials and introduces a new innovative high temperature insulating material based on renewable raw material rice husk ash (RHA) with an outstanding maximum service temperature and the ability to withstand liquid steel. In focus of the work are material properties and results of field trials.

LADLE COVERS

Development of castable with high thermal shock resistance

The VAD ladle cover is one of the vital and critical items for steel production through a Vacuum arc degassing unit (VAD). Under prevailing operating conditions of VAD, the ladle cover refractory has to withstand high thermal shock and a corrosive environment. Its operational condition and lining pattern also demand for high volume stability of the refractory material. A composition for a high alumina castable suitable for the manufacturing of pre-cast blocks was designed to get the desired properties. Based on the study, pre-cast blocks were manufactured with the developed castable and tested in the VAD ladle cover of ASP, SAIL. It was observed that the developed pre-cast blocks of the VAD ladle cover were highly stable at severe operating conditions and have the potential to achieve a long service life.

RAW MATERIALS

Designing colloidal silica-bonded porous structures for thermal insulation

Colloidal silica (CS) is a promising raw material for refractory castable ceramics. It consists of stable suspensions of synthetic amorphous silica nanoparticles that behave simultaneously as a liquid medium and binder for ceramic particles and as a porogenic agent and highly reactive source of silica to promote in situ reactions. The present study addresses the production of porous structures of in situ mullite attained from aqueous suspensions of highly porous transition alumina particles bonded with colloidal silica. By varying the production parameters, a wide range of useful properties can be tailored towards the production of porous mullite structures for primary or secondary thermal insulation or other refractory applications.

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BINDERS

Binders for Refractory Castables: An Overview

A binder for refractory castables is a bonding material that bonds a loose powdery mix, retains its shape after casting and allows the cast shape to set and harden for handling and further processing. A binder also improves sintering, as the castables are not compacted during shaping, causing poor densification and strength. Different bonding systems have their own advantages and limitations and are being used as per the requirements of the application site. The present paper reviews the different types of binders available for castables and gives an elaborate idea for their functioning and performance.