EVENTS

4th Freiberg Refractory Materials Symposium
The latest findings and practical experience in the development of refractory materials were presented by numerous reputable speakers from industry, research and development at the already 4th Freiberg Refractory Materials Symposium, held on April 25–27, 2022, in Freiberg in the heart of the German state of Saxony. No less important and topical was another subject that was discussed intensively at the symposium: sustainable use of necessary and available resources. In this context, the use of hydrogen, the role of new energy carriers and the associated challenges for refractory linings were discussed in depth.

THERMAL INSULATORS

Innovation Behind Energy Saving
Porous refractory ceramics combine the high thermomechanical and chemical resistances of oxide-based compounds with the low thermal conductivity and specific heat of porous materials. This three-part study is devoted to understanding and critically reviewing their outstanding behavior as thermal insulators for high-temperature industrial processes (200–2000 °C). The first part (Interceram, v. 70, n. 03, 2021, p. 38-45, “The Science Behind Energy Saving”) provided a compilation of updated information on thermal energy consumption per area of human activity and examples of industrial processes that occur in each temperature range. The second part presented classification criteria for insulators established according to their properties. This third part will focus on novel products and their applications.

CEMENTED SILICA

Transformation Mechanisms in Silica Bricks
Silica bricks with cemented silica and crystalline silica as raw materials show different properties. In this paper, the phase and structural characteristics of different kinds of silica raw materials and silica bricks after heat-treated at different temperatures are explored, and the formation mechanism of tridymite in the silica bricks is clarified. Results show that the liquid phase formed by impurities in both crystalline silica and cemented silica raw material cannot promote the transformation of quartz to tridymite at high temperatures.

MICROCRACKS

Influence of the Fine Fraction and Sintering on Selected Isotropic and Anisotropic Bulk Properties of Uniaxial Compacts
This study focuses on the influences of the fine particle fraction and the minimum particle size on the density, the shrinkage, the Young’s modulus E, and the anisotropies of shrinkage and E. A lower minimum particle size and a higher fines content improved the particle packing, lubrication and sintering densification resulting in higher densities and E. Presumably due to a lower-density neutral zone after pressing, the anisotropic shrinkage was higher in the pressing direction, improving the density homogeneity. For the Young’s modulus, the extent of the anisotropy increased mainly with a higher sintering capability (high fines content). Especially the core as a part of the neutral zone had a lower E. Exemplary density and open porosity distributions revealed that flaws formed in the core, which led to the lower E.

Termine

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