11th Scientific / Research Symposium with International Participation
„Metallic and Nonmetallic Materials“ Zenica, B&H, 21-22. April 2016.

NEW TECHNOLOGIES IN THE FIELD OF REFRACTORY MATERIALS

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Refractory demand is driven by growth in emerging markets, new processing technologies and products in the customers industries mainly iron and steel, cement, lime, non-ferrous metals, glass, environmental, chemical and energy industry. The need for high-quality refractory solutions for particular applications is steadily rising. Steel industry reports about approximately 75% new steel grades developed in the past 20 years. This results in a potentially high need for refractory innovations only in this particular application in iron and steel industry where about 70% of all refractories are used. To meet steadily increasing requirements innovative refractory material, refractory design or complete system solutions including machinery are necessary. The main development targets are performance improvement, safety and ergonomics optimization, environmental issues and governmental regulations, improvement of the customers product quality and to rise the customers production capacity. In this context also the total cost of ownership comprising costs for refractory material, energy, repair and maintenance have to be taken into consideration. Accurate fact finding and understanding of frame conditions at the customer is indispensable for successful projects. To reach the target of innovative refractories lining solutions highly sophisticated development tools, starting at computerized simulation tools, customized structural designs, macroscopic design studies and water modelling up to chemical, physical, microscopic and technological evaluation of the new material properties are used. The presentation provides selected examples for new refractory technologies which cover functional products such as purging plugs or materials for flow control like a new generation of slide gate systems and monoblock stoppers. Included are also new lining design solutions for the steel ladle to increase the steel yield and tundish flow modifier for optimization of steel flow behavior as well as examples for new refractory material developments for steel and cement industry.