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Improving carbon efficiency in refractory industry with nanographite brick technology

Refractory is a key part on the production of all metals used by the modern society. Steel presents the highest demand on most of our day by day use from automotive exteriors to garbage cans and rail. The refractory industry is driven by the development of new or improved processes demanded by the customers and steel industry has been pointing out the tendency for high quality steel which requires sophisticated manufacturing technologies and decarburization rate for the low carbon content below 20ppm. As the requirements for steel quality have become increasingly strict with strong demand for high strength and high toughness steel plates, a new refractory generation with extra low carbon was developed. Besides the advantages of energy economy in steel process and higher clean steel, another additional benefit includes less CO, emissions.

Extra low carbon bricks mean less thermal conductivity products and only can be achieved by replacing natural graphite by special nanographite. This new raw material was conceived to withstand the same oxidation resistance than natural flake graphite to compensate the nano particle size and also to achieve the desired properties to match the requirements for steel industry trials. This work presents the nanographite approach to the real application in steel production with an expressive reduction in the amount of graphite from 5%wt to 1%wt. Properties and customer's trial with nanographite bricks in steel ladle are also shown with improving carbon efficiency in an environmental friendly product.

Speaker Biography

Carlos Pagliosa graduated in material engineer at Federal University of São Carlos (UFSCar), with MSc and PhD at UFSCar and post-doc study at ETH (Zurique). He has been a researcher in the refractory field for 25 years. Actually, on the position of researcher at RHI Magnesita's R&D, responsible for developing MgO-C refractories for BOF and bricks for ladles.

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