

Urea based sols as binder for nano-oxide bonded high alumina refractory castables

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Abstract:

Cement free high pure alumina castables are developed for high temperature applications with nano oxide bonding developed by using different sol systems synthesized by using urea as the precipitating and hydrolyzing agent. Bonding of the constables is based on nano oxide powders of alumina, mullite and spinel compositions using their respective sols as bonding agents. The sols are prepared from nitrate precursors using urea and are used in the high alumina castable formulation. The castable compositions are conventionally processed using the synthesized sols as sole binders and characterized for various refractory properties after heat treatment at different temperatures. These synthesized sol containing compositions are also compared with the commercial silica sol containing ones and cement bonded castables, processed under similar conditions. Considerable improvement in terms of hot strength, corrosion resistance and thermal shock resistance are obtained for the synthesized sol containing nano oxide bonded castables.

Keywords:

Cement-free castable, Sol-gel binder, UreaHot-strength, Thermal-shock, Slag resistance

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