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Nano Mullite Bonded Refractory Castable Composition for High Temperature Applications

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Abstract:
Development of high pure alumina castable is studied by using synthesized mullite sol as the sole binder. Mullite sol is prepared by wet chemical route and is characterized by its solid content, particle size, thermal analysis, phase development with temperature, microstructure, etc. This sol is used at two different percentages in high alumina castable compositions with two different particle size distribution patterns. Conventional castable processing is done on the compositions and the characterizations are done after heat treatment at three different temperatures. Finally, the best composition is also compared with the commercially available silica sol containing high alumina castable with similar particle size distribution. Considerably improved hot strength, high corrosion resistance and flexural strength (hot modulus of rupture) are obtained for the mullite sol containing composition but with relatively lower thermal shock resistance.

Keywords:
Cement free castable, Mullite sol, Corrosion, Hot modulus of rupture, Thermal shock resistance

Link: https://www.sciencedirect.com/science/article/pii/S0272884216306721