

The Third Article

Number (17) In The List of Total Publications

M.M.S. Wahsh^a, A.G.M. Othman^a, **S. Abd El-Aleem^b**, “The influence of nano-silica and zircon additions on the sintering and mechanical properties of in situ formed forsterite”, Journal of Industrial and Engineering Chemistry; 20 (2014), pp. 3984-3988.

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Abstract

The influence of nano-silica and zircon additions on the sintering and mechanical properties of in situ formed forsterite fired at 1550°C for 2h was investigated. The results indicated that, nano-silica improved in situ formed forsterite at the firing temperature, while zircon additions enhanced the sintering of the investigated samples. XRD analysis and SEM examination observed a good crystallinity of in situ formed forsterite with nano-silica and/or zircon additions. Densification parameter (BD =3.22 g/cm³ and AP =5.82%), cold crushing strength (CCS =285 MPa) and micro-hardness (Hv = 660) were enhanced with zircon additions.

The Fourth Article

Number (21) In The List of Total Publications

H.A. Abdel-Gawwad^{*}, **S. Abd El-Aleem**^{**}, “Effect of reactive magnesium oxide on properties of alkali activated slag geopolymer cement pastes”, *Ceramics – Silikaty*; 59 (1) (2015), pp. 37-47.

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Abstract

The effect of different proportions and different reactivities of MgO on the drying shrinkage and compressive strength of alkali activated slag pastes (AAS) has been investigated. The slag was activated by 6 wt. % sodium hydroxide and liquid sodium silicate at ratio of 3:3 wt. %. The different reactivities of MgOs were produced from the calcination of hydromagnesite at different temperatures (550, 1000, 1250°C). The results showed that, the reactivity of magnesium oxide decreases with increasing the calcination temperature. Also, the drying shrinkage of AAS was reduced by the replacement of slag with MgOs. The highly reactive MgO accelerated the hydration of AAS at early ages. The replacement of slag with 5 % MgO₅₅₀ increased one day compressive strength by ~26 % while MgO₁₂₅₀ had little effect. A significant increase in strength was observed after 7 days in case of replacement of slag with 5 % MgO₁₂₅₀. The MgO reacts with slag to form hydrotalcite like-phase (Ht) as detected by XRD, FTIR spectroscopy, TGA/DTG analysis and SEM.