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P.S.B.24

PROPERTIES AND STRUCTURAL CHANGES OF THERMALLY AND MECHANICALLY ACTIVATED KAOLIN CLAY

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The paper presents properties of thermally and mechanically activated kaolin clay, with respect to its application as a pozzolanic additive in cement-based systems. Starting kaolin clay is mainly composed of minerals kaolinite and quarz. Properties of thermally activated clay in the laboratory furnace at temperature 650^{o}C for 120 min (optimal conditions) are: pozzolanic activity of 0.45g $Ca(OH)_2$/g Pozz, mean particle size of 10.2 μm and loss on ignition (LOI) of 0.88. Mechanical activation for 120 min in a planetary ball mill significantly affects the properties, activity is 0.74g $Ca(OH)_2$/g Pozz, mean particle size 4.5 μm and LOI of 6.82. Structural changes were monitored using XRD and TG/DTA analysis. The advantage of mechanical activation is not only in the high activity and small mean particle diameter, but also in simplicity of the process and its environmental benefits.

P.S.B.25

X-RAY EMISSION AND MOSSBAUER SPECTRA AND ELECTRONIC STRUCTURE OF $ScFe_2Si_2$ AND $HfFe_2S_2$ COMPOUNDS

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The valence band electronic structure of compounds with the $HfFe_2S_2$ crystal lattice type has been established for the first time based on X-ray emission spectroscopy measurements. Band structure and theoretical spectra of X-ray emission bands of atoms located in non-equivalent crystallographic positions are calculated by means of the LMTO method. A satisfactory agreement between theoretical and experimental data is achieved. As it can be seen from the performed calculations and experimental data, the *s*-states of Si hybridize with the *p*-states Sc (Hf) and Fe and are located at the bottom of valence band. Contribution of the *s*-symmetry electrons to the chemical bond is substantially different for Si atoms located in non-equivalent crystallographic positions. ^{57}Fe Mossbauer absorption measurements confirm iron atoms occupying non-equivalent positions in the crystal lattice.