

Examination of geopolymer materials properties formed via alkali activation of black coal ashes with a high content of loss on ignition

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Abstract

The utilization of the fly ashes in Slovakia is lower than in other countries and dumping of the fly ashes prevails. The dumping changes chemical and phase composition of the fly ashes and so it decreases possibilities for their utilization. Fly ashes are mainly used in building industry, where the content of loss on ignition (LOI) is limited due to standards. Black coal fly ashes produced in Slovakia have a high content of loss on ignition – more than 20 % – so they straight utilization in the building industry is not possible. The current possibility for their utilization is in

geopolymer synthesis. Products with 28-day compression strength of 35.7 MPa and 180-day compression strength of 55.0 MPa were obtained by the alkali activation of fly ashes with 23.25 % LOI with 8 wt.% Na₂O and their next hardening in the temperature of 80 °C during 6 hours. Products have a great frost-resistance and aggressive environments resistance (NaCl and H₂SO₄ solutions).

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