Programme & The Book of Abstracts

Twentieth Annual Conference

YUCOMAT 2018

Herceg Novi, Montenegro, September 3–7, 2018

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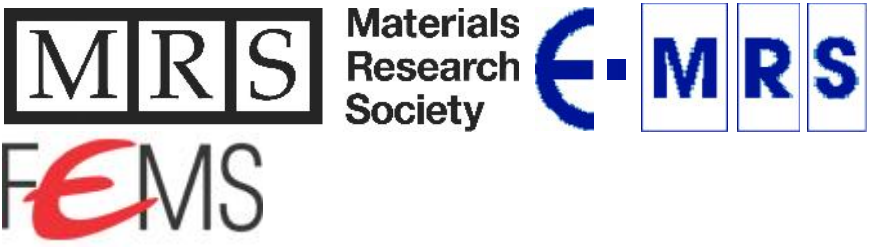

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New multifunctional materials based on steel slag

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Electric arc furnace slag (EAFS) is the by-product of steel production in an electric arc furnace. In a pass two decade a special attention is paid to the valorization of metallurgical slags by alkali activation. The process involves a chemical reaction of slag with the alkaline activator followed by the condensation and hardening processes. Aluminium-containing calcium silicate hydrate gel i.e. C–(A)–S–H gel with a low C/S ratio has been identified as a reaction product of slag alkali activation.
We have synthesized the AAS using the EAFS as the precursor and Na_2SiO_3 solution as an activator. The AAS samples are characterized by XRD, SEM/EDS and FTIR analysis. Moreover, investigation of mechanical properties dilatometric and porosity analysis were performed as well so as to build up a detailed illustration of AAS properties and possible application of these materials.
The results have shown that AAS may reach the compressive strength (~ 40 MPa) which enables its application in a civil engineering. Moreover, the AAS sample exhibits improved strength (~ 50 MPa) at elevated temperatures thus potential application of these materials in a high temperature conditions should be considered. On the other hand, these materials may be used as an effective adsorbent for the Cu2+ removal from sulfate bearing wastewater. The Cu_2^+ ions have been found to be attached on the surface of AAS by formation of stable hydrooxocomplexes that are sorbed on the adsorbent surface via hydroxyl groups in the form of posnjakite crystal phase.

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