Al-rich industrial residues for mineral binders in ESEE region

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Al-rich mineral resources are one of the essential components for the production of the novel sustainable mineral binders. Belite-sulfoaluminate (BCSA) cements, which are considered as low-carbon and low-energy, allows the substitution of natural raw materials with secondary ones. In East-Southeast European countries (ESEE) there are huge amounts of various industrial and mine residues that are either landfilled or currently have a low recycling rate. These residues are generated from mining activities (mine waste) and as a by product of different types of industry, such as thermal power plants, steel plants or the aluminium industry (slags, ashes, red mud, etc.). Within the framework of the RIS-ALiCE project, in cooperation with 15 project partners from Slovenia, Austria, France, Hungary, Serbia, Bosnia and Herzegovina and Macedonia, a network of relevant stakeholders has been established in the field of currently unused aluminium-containing mine and industrial residues. Inside the created network mine and industrial residues have been mapped and valorised in order to evaluate their suitability for the use in innovative and sustainable low CO_2-mineral binder production. Aluminium-containing residues are characterized with respect to their chemical, physical and radiological composition using different analytical methods such as X ray fluorescence spectroscopy, ICP optical emission spectrophotometry, gravimetry, X ray powder diffraction, gamma spectroscopy, etc. The long-term activity of network between wastes holders/producers and mineral end users will be enabled via developed Al-rich residues registry, including a study of the potential technological, economic and environmental impacts of applying the innovative methodology of the sustainable secondary raw materials management in ESEE region. Developed registry with the data valuable for both, waste providers as waste users in ESEE region, can be later-on upscaled also to other regions of Europe. It will provide the data on the available and appropriate Al-rich secondary resources, which will enablethe production of innovative low-CO_2 cements.

Keywords: secondary raw material, alternative binders, Al-rich residues, networking, mapping, valorisation, registry.