

Utilization of Clayey Freshwater Sediments Through Geopolymerization

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Some of the biggest challenges in the construction industry in recent times are the mitigation of the environmental impact of this sector, the reduction of dependence on primary raw materials, and the reduction of CO₂ production while maintaining functional properties. Alkaline activation of a number of waste products represents a promising way to achieve the above-mentioned goals, but the availability of a number of waste products changes over time, especially in Europe. While freshwater sediments were in the past widely utilized as an agricultural fertilizer, the recent precautions significantly decreased such an application thus new destinations must be delivered. To explore a potential of freshwater sediments, selected samples from various locations were subjected to detailed characterization to verify the applicability of the material for a geopolymer design. As recognized, selected sediments contain a substantial volume of desired mineralogical compounds that can serve, after elevated temperature curing, as suitable precursors. Such samples have been consequently activated by a mixture of alkaline activators to obtain dense structure and subjected to detailed investigation aimed at understanding the mechanical parameters. Obtained results reveal the engineering potential of sediments for valorization through geopolymerization and outline new research challenges in the field of inorganic polymers.