

# **Geopolymer Mortars Based on Reactive Ultra-Fine Fly Ash Doped with Carbon Admixture: Thermoelectric Potential**

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Favorable thermoelectric properties is an essential presumption in the design of building materials that are able to harvest energy. Especially the conversion of industrial waste heat to electrical energy can make certain energy savings in the future. The main important tasks consist in the optimization of material thermoelectric properties by increasing the Seebeck coefficient, optimization of thermal properties, and evaluation of the thermoelectric conversion efficiency represented by the figure of merit. The research is focused on the design of geopolymer mortars based on reactive ultra-fine fly ash (RUFA) with carbon admixture. Admixing electrically conductive fillers to fresh mortar results in an enhancement in the electrical conductivity of the material, but usually negatively influences the compressive and flexural strength caused by increase in porosity. For this reason, it was necessary to subject the material to detailed experimental analysis represented by evaluation of basic physical, mechanical, thermal and electrical parameters. Finally, the proposed materials were tested in terms of thermoelectrical behavior and the Seebeck coefficient and Figure of Merit values were determined and compared between the results of other authors. Based on the results obtained, the potential of the individual materials for further applications in smart structures was analyzed.