

# Multicomponent Utilization of Fly Ash: Dream or Reality

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## **ABSTRACT**

The present investigation is an attempt at the multicomponent utilization of fly ashes (FAs) obtained from coal-fired thermoelectric power stations (TPSs). The experiments carried out are based on detailed chemical and mineral characterizations of these complex combustion residues. A combination of methods including sink-float, magnetic and sieving separations, leaching and crystallization procedures, as well as various physical and chemical analyses were used to separate and characterize the products recovered from FAs at some Spanish TPSs. Both potentially useful and hazardous fractions were sequentially derived. The products recovered included ceramic cenospheres, water-soluble salts containing some trace elements, a magnetic concentrate enriched in siderophile and certain chalcophile trace elements, a char concentrate with some volatile trace elements, a heavy concentrate containing various trace elements, and finally an improved FA residue for construction materials. The data provide information on the composition and certain properties of the fractions and components separated from the combustion waste products. The preliminary results could be used as an initial basis for a multicomponent, wasteless, and environmentally friendly utilization of fly ash. The study shows how a waste product can be transformed into useful and high-grade materials which could find various applications as special ceramics (fire-, heat- and sound-insulating materials), fillers, pigments, raw materials for metallurgy, heavy suspensions for ore and coal preparation, carbon matrix, sorbents, catalysts, fuels, fertilizers, etc.