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## IMPROVING SOIL QUALITY BY ADDING MODIFIED ASH

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### Abstract

Fly ash and fly ash based zeolites are inorganics used for improving soil quality. In the current paper, the hydrothermal modification of fly ash was studied. Three methods have been employed for this purpose. The first method involved the use of an autoclave, where synthesis has been performed at a temperature of 120 °C and a treatment time of 4 to 8 hours. Within the second method, the modification of the ash at a temperature of 600 °C by fusion was carried-out. In this method, a mixture of ash and KOH was subjected to treatment for a period of 1-2 hours. The last method, more feasible from ecological and economical point of view, consisted in using a microwave oven for modifying the fly ash.

The synthesized materials were characterised with respect to microstructure (electronic microscopy SEM), chemical and mineralogical composition (EDAX, X rays diffraction, FT-IR). EDAX analysis evidenced the absence of several heavy metals that have no role in the life cycle of the living organisms such as Hg, Cd and Pb, in both ash and zeolite. By analysing the obtained data, one may observe the destruction of the ash network and crystallization of the new phase, especially in the case of treatment by diffusion at ratios of 1/3. The XRD analysis confirms the presence of zeolite (K-chabazite). Good results were also obtained in the case of using microwaves treatment for zeolite synthesis; also the time of treatment significantly decreased in this case.

*Key words:* characterization, fly ash, synthesis, soil, zeolites

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