

MAGNETIC PHASES IN SEWAGE SLUDGE AND COMPOST

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The magnetic properties of sewage sludge and compost of the sewage plant Leoben (Austria) have been studied in the frame of an EU-funded interdisciplinary research project in order to determine the suitability of magnetic parameters to indicate heavy metals. Mineral magnetic measurements were combined with chemical and mineralogical examinations (reflected-light microscopy, scanning electron microscopy and microprobe analyses). It became possible to divide the samples into groups according to their grain-size spectrum and with regard to the incidence of weathering or conversions into secondary minerals such as lepidocrocite. The findings proved that the magnetic fraction of the individual samples virtually consists solely of anthropogenic particles. Furthermore the frequency count of individual particles by means of a reflected-light microscope showed that magnetite and hematite were the most prevalent among the magnetic mineral phases. Calcium ferrite and lepidocrocite constituted a considerable part of the magnetic fraction, while metallic iron and nickel-chrome-alloys were rated as minor components. All samples included similar or almost identical particles such as globular-shaped particles, sinter and slag. A comparison of the magnetic parameters with the heavy metal content further showed a significant positive correlation with arsenic, cadmium, chrome, cobalt, lead and the like. The achieved results confirmed that magnetic proxy parameters provide significant results for industrial pollution monitoring in the steel and iron manufacturing industry, for example in Leoben, with respect to both type as well as amount of anthropogenic particles.

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