Remediation of polluted soils- Part 3

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Preface

Remediation of polluted soils- Part 3

The collection of papers presented in this special issue is an outcome of the SSS8.3 Session "Remediation of Polluted Soils" of the International European Geosciences Union (EGU) Conference held in Vienna, April 2015.

Soils are essential components of the environment, the basis of terrestrial ecosystems and a crossroad of biogeochemical cycles at the lithosphere-hydrosphere-biosphere-atmosphere interface. Therefore soils are a limited, precious and fragile resource, the quality of which should be preserved. However, the increased concentration and distribution of heavy metals, metalloids, radionuclides and organic xenobionts in soils by anthropogenic mismanagement of industrial and mining activities, overuse of agrochemicals, sewage and waste disposal cause contamination, environmental problems and health concerns. Hence, soil pollution needs innovative technologies of remediation.

This special issue contains 19 papers written by authors from 13 countries: Australia, Chile, China, Georgia, Germany, India, Iran, Italy, Japan, Peru, Poland, Russia and Spain. This collection of original studies focuses mainly on seven topics: 1) wastes as sorbing agents, 2) coal mine wastes, 3) radionuclides, 4) urban and peri-urban soils, 5) sequential fractionation, 6) distribution of metals, and 7) environmental risk assessment.

There are five papers dealing with the first topic, wastes as sorbing agents:

Lewinska et al. examined in a batch experiment the capacity of Fe-Mn wastes produced by water treatment plant for arsenic sorption and immobilization in highly contaminated soils from a former mining and processing. Application of increasing doses of Fe-Mn wastes to silt loam and sandy loam soils resulted in substantial decrease of As extractability. The presence of sewage sludge had apparently reverse impact on As solubility, and reduced the effect of immobilization particularly at lower rates of Fe-Mn wastes.

Bezuglova et al. studied the applicability of brown coal from Alexandria deposit (Ukraine) as sorbing and detoxifying agent of soils contaminated with heavy metals. Laboratory and field plot experiments have been conducted. Brown coal can be recommended as an ameliorant for soils contaminated with Pb, Zn and Cu. An empirical formula was proposed for the calculation of the most cost-efficient ameliorant rate.

Liu et al. evaluated the potential application of the hydroxyapatite derived from flue gas desulphurization gypsum for Pb and Cu adsorption in water and immobilization in soil. MINTEQ software was employed to determine the species distribution of Pb^{2+} and Cu^{2+} at different pH values. This study realized the potential of a modified geochemical waste material towards remediation of metal contaminated soils, providing useful information for other wastes such as paper sludge and phosphogypsum.

Lee et al. described the synergistic effect of As^{5+} and Sb^{5+} removal by magnetic nanoparticles supported layered double hydroxides (MLDH). The MLDH demonstrates effective removal