

**New Remediation Techniques for Polluted Water and
Contaminated Sediments by Application of Minerals**

H. Minato

University of Tokyo

Tokyo, Japan

T. Morimoto

Astec Co.

Tokyo, Japan

Water, soil and sediments with heavy metallic ions, arsenic and etc., have been developed with applications of minerals in association with selected inorganic materials. Hazardous waste materials are produced in urban areas, through industrial productions and through mining operations. The pollutants also occurred in natural conditions with some contaminated sediments. Treatments for polluted waters, including of underground water, are required as neutralization, adsorption, concentration and precipitation. For the adsorption with hazardous elements and condensation of the precipitation, inorganic mixture, silica, alumina and iron with alkaline earths and natural zeolite powder (TRP) are used. When high-grade pollution by arsenic, ferric sulfate is added to the mixture. To prevent polluted soils and sediments provided by heavy metals, arsenic and etc., weathered soils, such as volcanic loam, and natural zeolites with calcined limestone and dolomite are applied. The volcanic loam composed with quartz, feldspars, with clay minerals, halloysite, smectite and etc., allophane, hydrous amorphous compounds and two kinds of natural zeolites, clinoptilolite and mordenite, are main minerals for this techniques. Small amounts of calcined carbonates mixed to the material, also. After this mixture of minerals was mixed with polluted soil, hazardous ions were cation-exchanged in zeolites, first, then fixed in a new crystal phase of hydrous alkaline earth alumino-silicate as minor elements, and this new phase becomes a stable one along time.