

Remediation of Heavy Metal Contaminated Soil with Vivianite Nanoparticles

Authors : Shinen B., Bavor J., Dorjkhand B., Suvd B., Maitsetseg B.

Abstract : A number of remediation techniques are available for the treatment of soils and sediments contaminated by heavy metals. However, some of these techniques are expensive and environmentally disruptive. Nanomaterials are used in the environment as environmental catalysts to convert toxic substances from water, soil, and sediment into environmentally benign compounds. This study was carried out to scrutinize the feasibility of vivianite nanoparticles for remediation of soils contaminated with heavy metals. Column experiments were performed in the laboratory to examine nanoparticle sequestration of metal in soil amended with vivianite nanoparticle suspension. The effect of environmental parameters such as temperature, pH and redox potential on metal leachability and bioavailability of soil amended with nanoparticle suspension was examined and compared with non-amended soils. The vivianite was effective in reducing the leachability of metals in soils. It is suggested that vivianite nanoparticles could be applied for the remediation of contaminated sites polluted by heavy metals due to mining activities, particularly in Mongolia, where mining industries have been developing rapidly in the last decade.

Keywords : bioavailability, heavy metals, nanoparticles, remediation

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