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MERCURY REMOVAL BY SOME SOILS OF JAPAN FROM AQUATIC ENVIRONMENT

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Abstract

This study investigates the efficiency of six types of soil, upper, lower and shell fossil layer of shirasu soils of Kagoshima; tuff soil of Shimane; Akadama and Kanuma soils of Tochigi, Japan in removing Hg from aquatic phase by analyzing the morphological and chemical properties. Morphological and chemical characterization of each soil was executed by SEM-EDS analysis as well as Hg removal study was performed by batch operation mode. SEM-EDS characteristics revealed soils particles predominantly constituted of SiO_2 (21.8–78.5%), Al_2O_3 (4.1 – 38%) and FeO (0.8 – 7.7%) in all soil types excepting tuff soil where CaO showed highest percentage (65.3%). Organic matter and CuO were exclusively observed in Kanuma and Akadama soils. A critical appraisal of total Hg removal (36.4 – 48.15 µg/L) data clearly revealed that though maximum Hg removal efficiencies were observed in Kanuma (0.27µg/L/g/h) and Akadama (0.26 µg/L/g/h) soils, but former one was superior. Obtained results also demonstrated Hg removal of soils is potentiality governed by higher percentage Al_2O_3 lower percentage SiO_2, CuO and organic matter content of soils. Therefore, it may be concluded that Kanuma and Akadama soils can be used as a low-cost potential Hg adsorbing agent for treating the Hg contaminated effluents in order to reclaim the aquatic environment.

Key words: mercury, removal efficiency, soils, SEM-EDS, water reclamation

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