

Development of filtering materials for removing heavy metals utilizing industrial by-products

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In developing countries, waste materials including industrial by-products are often dumped directly without any segregation and treatment. The amount of discharge is significantly increasing and segregation and treatment of these materials are essentially needed. From waste materials, harmful substances such as heavy metals can leach, causing soil and groundwater pollutions. To solve these problems, cost effective filter materials for removing harmful heavy metals were developed utilizing industrial by-products. This study also contributes to increase additional values for waste materials. For development of filter materials, AAC (Autoclaved Aerated Concrete) and SS (Steel Slag) were selected and column tests using only AAC and mixture material of AAC and SS were carried out to evaluate their adsorption capacities for Pb^{2+} and Cd^{2+} . As a result, AAC adsorbed almost 100% of Pb^{2+} from the Pb^{2+} solution (100 ppm), but, it did not adsorb Cd^{2+} much from the Cd^{2+} solution (100 ppm). On the other hand, the mixture material of AAC and SS adsorbed almost 100% of each heavy metal (100 ppm). It also adsorbed almost 100% of both Pb^{2+} and Cd^{2+} simultaneously from their mixed solution (Cd: 50 ppm and Pb: 50 ppm). These results suggested that the mixture of AAC and SS can be applied as cost effective filter materials for removing heavy metals.

Keywords: heavy metals, filter materials, industrial by-products, adsorption, column test