APPLICATION OF CRUSHED GRAINS OF LATERITE AND AUTOCLAVED AERATED CONCRETE FOR HEAVY METAL REMOVAL FROM WASTEWATER

*Buddhika Priyadarshani Bandara Arachchillage[1], Yuki Yoshida[1], Pradeep Kumara Gajanayake Mudalige[1], Akihiro Matsuno[1], Ken Kawamoto[1]

1. Graduate School of Science and Engineering, Saitama University

Adverse effects on the environment and human health is highly influence by heavy metal contamination in water is a global significance problem. Among conventional treatment technologies for treating wastewater, a particular attention is given to adsorption process, considering as low-cost and easy technical applicability. In this study, in order to examine the applicability of locally available geo-materials and industrial by-products as cost-effective adsorbents in the treatment technology of heavy metal-contaminated water, laterite made from Vietnam and autoclaved aerated concrete were tested for the removal of arsenic and chromium in wastewater. Zeolite made from Japan was also used as a reference material. The testing samples were first grounded and sieved to be 0.105-2 mm grain size. The standard batch adsorption method by Organization of Economic Cooperation and Development (OECD 2000) was applied to determine adsorption isotherms. The isotherm experiments were evaluated for 1:10 solid liquid ratio at natural pH and 20 ^{0}C temperature for solutions with initial concentrations ranging from 100 –2000 mg/L for both metals. The results indicated that Langmuir isotherm described the experimental data the best. Laterite removed arsenic and chromium in solutions up to 8.21 and 1.33 mg/g respectively. It revealed that laterite had higher adsorption capacity for arsenic than autoclaved aerated concrete. The measured removal percentages decreased with increasing in initial ion concentrations. Future, the adsorption mechanism will be suggested by correlating both laterite and autoclaved aerated concrete for heavy metal removal from wastewater.

Keywords: Adsorption , Heavy metals, Industrial by-products, Low-cost adsorbents, Wastewater

