



The sorption property of As(III) and As(V) from aqueous solution using waste cast iron

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The sorption property of As(III) and As(V) from aqueous solution was investigated using waste cast iron(WCI), which is a byproduct of the iron casting process in foundries. Two types of WCI were used in the experiment: grind precipitate dust (GPD) and cast iron shot (CIS).

Non-equilibrium batch experiments were performed under different concentrations of As(III) and As(V). Results showed that waste cast iron was effective in the removal of As(III) and As(V).

The phase changes of sorbed As species on the GPD using XPS (X-ray Photoelectron Spectroscopy) were investigated. The results showed the binding energy of 45.19eV for As(V) were obtained, whereas two of 45.3eV and 43.91eV for As(III) were shown in GPD. It can be strongly suggested that GPD mediated As(V) had no evidence for the reduction of ionized As(V) species into As(III), whereas GPD mediated As(III) showed a partial oxidation of As(III) into As(V).

The qualitative and quantitative analysis of As distribution and metal containing phase in WCI surface through the XRF, XRD, EPMA, EDS patterns, BSE and SEM image were investigated. The GPD and CIS are a spherical shape with Fe₀ composition in correspondence with XRF and XRD analysis results. Quantitative analysis for molar ratio of Fe and As indicated a 1.1% and 1.5% of As(V) and As(III) molar fractions were observed in GPD, while 5.1% and 0.9% fractions in CIS.