The Leachability and Speciation of Arsenic and Selenium in Coal Fly Ash

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ABSTRACT

Batch leaching test was employed to investigate the leaching potential of arsenic (As) and selenium (Se) from one pair of samples with relatively high calcium content. The effect of pH and solid to liquid (S/L) ratios on As and Se leaching was examined. Maxima As leaching occurred at pH 7-8, and soluble As concentration slightly increased with decrease of S/L ratio, indicating As leaching process was controlled by both adsorption and precipitation. Se displayed increasing leaching with increase of pH, and soluble Se concentration increased with the increase of S/L ratio. Speciation of As and Se in fly ash leachates obtained under both oxygen atmosphere and nitrogen atmosphere conditions was determined using HPLC-ICP-MS. Only one arsenic species, As(V), and one selenium species, Se (IV), were detected in all leachate samples Total As analysis using ICP-MS agreed well with the speciation analysis with HPLC-ICP-MS, while Se concentration showed a deviation between the two analysis method, which may be due to a higher detection limit with HPLC system. This information is important for understanding the arsenic and selenium leaching from fresh fly ash in field.

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