

The Heavy Metal Leaching Behaviour of Australian Fly Ashes

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ABSTRACT

Batch leaching tests have been performed upon a range of Australian fly ashes obtained from power stations burning a variety of coals. The leaching tests were carried out over a period of 144 hours using different initial pH values to assess the influence of pH on element mobility. The ashes and leachates were analysed for a wide range of trace elements including As, Cd, Cu, Mo, Se and Pb.

The pH values developed during the leaching process appear to be related to the acidity and alkalinity of the fly ashes and independent of the starting pH, the acidic fly ashes producing acidic to neutral pH values and the alkaline ashes alkaline pH values above 9.5. For the acid ashes the ease of leaching of the trace metals is in the order Cd>Se>Mo>As>Cu or Se>Cd>As>Mo>Cu and for the alkaline fly ashes Mo>Se>Cd>As>Cu. The percentage leached of an element varies from 12-20% of the total element concentration in the case of Mo to less than 0.15% for Cu.

The results of this study show that the pH of the leachate depends upon the pH of the original fly ash. They also indicate that the release of heavy metals is a very slow process and generally only a small percentage of the elements present in the fly ash are removed by leaching, even after 144 hours. The leaching behaviour is complex, showing no clear relationship to changing pH values.

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