

Speciation and Leachability of Trace Elements in Australian Fly Ashes

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ABSTRACT

There is a lack of information on the speciation of the environmentally significant trace elements in coal ash from power stations. Such information is, however, crucial to understanding the behaviour and environmental impact of the trace elements when ash is disposed of into landfill or ash dams. The chemical form and mode of occurrence dictate element leachability from coal combustion residues and are important parameters in assessing the environmental and health impacts of ash disposal or use. The toxicity of trace elements in the environment is also dependent upon their chemical form.

The results of two different selective extraction schemes applied to the same series of acid and alkaline ashes from Australian power stations have been compared. The results provide a basis for identifying the mode of occurrence for a number of key trace elements and hence a better understanding of the mobility of potentially toxic elements under different chemical conditions. The data show that, with a few possibly significant exceptions (e.g. As, B, Mo), no more than around 20% of the elements studied were able to be leached from the ashes in question. They also show that Eh, as well as pH, are critical determinants of mobility for those trace elements that are likely to be released from ash repositories. Because of the wide variety of speciation schemes published in the literature, full descriptions of the methods used to obtain the data are required in studies of this type.

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