

Understanding metals extraction mechanisms from fly and bottom ashes produced from municipal solid waste

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1. Introduction

This study investigates the metal extraction and metal binding mechanisms from bottom ash (BA-MSW) and the fly ash (FA-MSW) by sequential extraction using various solvents. The extracts obtained with each of these solvents were collected and analyzed to evaluate the metal binding mechanisms.

2. Experimental

The chemical and mineral properties of the collected ashes were also investigated using various analytical techniques, such as X-ray Diffraction (XRD), and inductively coupled plasma mass spectroscopy (ICP-MS). Two leaching stages processes of the samples were carried out: (i) water/solvent extractions, to remove undesirable substances such as chlorine and (ii) extraction under acidic or basic conditions.

3. Results and Discussion

BA-MSW and FA-MSW samples were observed under scanning electron microscopy (SEM) in various magnification, which helped to understand the texture as well as the morphology of the ashes (Figure 1). Figure 2 shows the metal extraction from the ashes at different extractants.

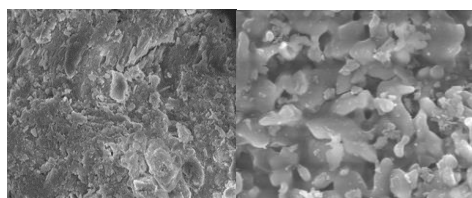


Figure 1: SEM images of BA-MSW (left) and FA-MSW (right).

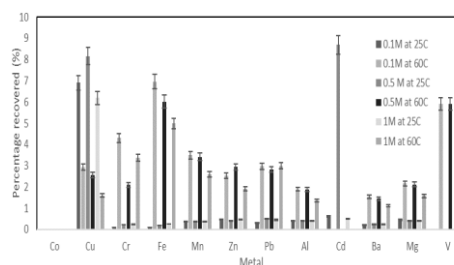


Figure 2: Metal extraction from BA-MSW

4. Conclusions

The ashes were rich with various metals including Fe, Al, Mg, and Pb in BA while Al, Ca, Na, K, Mg and Fe in FA. BA-MSW and FA-MSW preferred acidic solvent extraction (especially NH_3 and H_2SO_4).

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5. References

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