SEM-EDX Chemistry of Coal Ash versus WTE Ash

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EDS spectra of the whole area observed

Coal Fly Ash from India

EDS spectra of large smooth spheres seen in Fig A and B. These spheres tend to be rich in Si and Al, with varying amounts of Ca, K and Fe.
Coal Fly Ash and Bottom Ash Morphology: Thailand

1A: bright patch
Analysis: Pb, Cl
Hempsted Combined Ash: sieve -16

Unburnt wood material

Label A: Freemac flyash bulk area
Back in WTERT June 2003-meeting we proposed:

- Characterize Bottom Ash (BA) and Fly Ash (FA) from several WTE plants both chemically and by SEM:
  
  - Do different combustion processes generate different ashes?
  - Does extent of combustion generate different ashes with different organic carbon content (need for COD analysis)?
  - How does ash chemistry correlate with solid waste composition (i.e., plastics content, original MSW composition)?

- Compare bioavailability from leaching results of different mixture ratios of BA and FA:
  
  - Is dilution beneficial?

- Find the optimum pH conditions of the BA/FA mixture:
  
  - What is the optimum application scenario?
To Summarize the Main Research Questions Are

- Further leaching experiments of both fly ashes and potential ash-receiving matrices (i.e. soil; dredged sediments; landfilling materials)

- Understanding the toxic potential of leachate metals and chlorinated organics in relation to ash beneficial end-use and matrix-ash mixtures

- Unburnt carbon in fly ash: Is it beneficial because it has a binding (stabilizing) effect on low MW organics?

- Accounting for the impact of environmental stressors (i.e., variation of \( p\text{CO}_2 \Rightarrow \) alkalinity, pH, aging, temp, redox, rainfall)

- Making sound and profitable WTE waste management decisions

- Assisting the EPA in designing new ash-specific leaching tests