

Characterization of Mercury in Coal Utilization By-Products



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CUB Characterization

- ***Composition***
- ***Hg Release***
 - *Leaching Methods*



CUB Composition

- Proximate

$$CUB = H_2O + MM + C$$

- H₂O

- C

- LOI

- Mineral dehydration

- C source

- 450 ° C organic C

- 750 ° C unburned C

- 900 ° C carbonate C

- TGA



Mineral Matter Composition

- **Sample preparation**
 - Meta-borate fusion
 - Loss of volatile species
 - EPA 3052 –Triple acid digestion
 - Unburned C residue
- **Elemental analysis**
 - ICP-ES
 - CVAA
 - Hg DMA
- **Mineral**
 - XRD
 - Crystalline
 - >2%
 - SEM-EDS
 - Physical
 - Elemental Associations
 - Silicate/Non-silicate



Chemical/Mineralogical Composition

Elemental concentration

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Elemental mobility



Elemental Mobility Leaching Parameters

- **Composition**
 - Chemical
 - Mineral
 - Elemental
- **Physical**
 - Particle morphology
 - Permeability
- **Leachant**
 - pH
 - Volume
- **Time**



Leaching Methods Classification

- **Static**
 - Single addition of leaching fluid
 - Batch
- **Dynamic**
 - Renewed leaching fluid
 - Column
 - Serial Batch
 - Sequential Batch



CUB CHARACTERIZATION

- **Solid**
 - H₂O
 - C
 - Mineral Matter
 - Elemental
 - Mineral
- **Elemental Mobility**
 - Material properties
 - Leaching Method

