

Correlation between distribution of As, Se, and Hg in Fly Ash and Leachability

Chin-Min Cheng, Jacob A Vervynckt, Bianca Casenas, , Yan Cao, and Wei-Ping Pan

Institute for Combustion Science and Environmental Technology, Western Kentucky University, 2413 Nashville Road, Bowling Green, Kentucky

The objectives of this study is to (1) investigate the distribution of Hg, As, and Se in fly ash samples with respect to the unburned carbon, particle size, and surface area; and (2) study the leachabilities of these three elements distributing in the different portions of fly ash. Six fly ash samples generated from three different types of coal (i.e., bituminous, powder river basin (PRB), and lignite) were tested. Fly ash samples were divided into 3 different LOI groups (i.e., less than 2, between 2 and 7, and greater than 7). Samples in each group were sieved, producing 4 different mesh sizes (i.e., >150, 75-150, 38-75, and <38 μ m). The leachabilities of these elements in each of the subdivided sample were valuated using the TCLP method In general, higher Hg concentrations can be found in the groups with higher LOI values. However, an opposite trends were found for As. The correlation between Se and LOI depends on types of coal. As particle size increases, Hg concentrations decrease in the ashes produced from bituminous coal but increase for ash from PRB coal. In the case of As, the concentrations increase as the particle size increases for ashes from bituminous coal but decrease for ashes from PRB coal. No obvious trend was observed for Se concentrations for all three coal types. Depending on types of coals, the leachability of Hg, As, and Se associated with the distribution in fly ash.

Submitted for Consideration in the World of Coal Ash 2007 Conference, held May 7-10, 2007.