

**Characterization of Environmentally Sensitive Trace Elements in Coals and Fly Ashes from Bulgarian Power Plants**, Irena J. Kostova, Sofia University “St. Kliment Ohridski,” Department of Geology and Paleontology, 1000, Sofia, Bulgaria, irenko@gea.uni-sofia.bg; and James C. Hower, University of Kentucky, Center for Applied Energy Research, Lexington, KY 40511, hower@caer.uky.edu

The distribution of main and 17 trace elements (Ba, Mo, Rb, Sr, Co, Cr, Mn, Ni, V, As, Cd, Cu, Hg, Pb, Sb, Se, and Zn) considered as toxic and potentially hazardous air pollutants in the feed coals and fly ashes from four of the biggest power plants in Bulgaria (Maritza East 2, Maritza East 3, Republika, and Bobov Dol) were investigated. The feed coals are lignite and subbituminous, with high ash and high to moderate sulphur content.

Major oxides and trace elements, with the exception of Hg, were analyzed using X-ray fluorescence (XRF). Mercury analysis, on a whole coal or whole ash basis, was performed on a LECO AMS254 Advanced Mercury Analyzer.

Overall, the examined coals can be characterized as having high trace element contents. Some of them, such as Mo (up to 143 ppm), Cu (up to 207 ppm), and Pb (up to 48 ppm), display extremely high contents.

The mean values of trace element concentrations display relative enrichments in Co, Zn, V, Cr, Mn, Ni, Sr, Ba, and As in the investigated samples in comparison with other coals in the world. Cd, Se, Hg, and Rb are present in low to moderate concentrations in the feed coals.

The fly ashes from all investigated power plants have high molybdenum content (up to 178 ppm). Higher values than the world ashes were obtained for Cu, V, Zn, Se, Cr, Co, and Ni for all the investigated power plants, and for Mn and As for some of them.