

Batch Characterization Leaching Method

Peter A. Hesbach¹ and Ann G. Kim²

U. S. Department of Energy, National Energy Technology Laboratory, ¹ 3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507-0880; ² 626 Cochrans Mill Road, P.O. Box 10940, Pittsburgh, PA 15236-0940

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The By-Product Utilization Team at NETL has conducted an extensive leaching program on coal utilization by-products (CUB) to characterize the release of various cations, particularly heavy metals, by environmental fluids. However, the column leaching method is too time consuming and requires too much analytical support to be used as a routine characterization tool. A simpler, short term method to estimate the potential release of heavy metals from CUB is being developed to provide data with only two to three days of lab work. This protocol incorporates elements from various sources, particularly the International Ash Working Group and the Netherlands Energy Research Foundation. The method includes two steps: an availability test based on a sequential batch leach at various pH, and a serial batch leach at increasing liquid to solid ratios (L/S) of deionized water. For highly alkaline materials, the availability estimate is made with de-ionized water at an unregulated pH, followed by pH 8, then pH 4. Only the two lower pH levels are needed for more neutral or acidic CUB. The availability test is intended to quantify the maximum amount of an element that can be released when exposed to natural fluids. The serial batch test is used to determine the release of elements as a function of the L/S, with increasing L/S assumed to simulate prolonged exposure. The method has included serial batch leaching with DI water up to a cumulative liquid to solid ratio of 100. Results have been compared with data from NETL's column leaching work.