

Application of Glass Corrosion Tests to the Reactivity of Fly Ash

**Walairat Bumrongjaroen¹, Isabelle Muller¹, Jeffrey Schweitzer²,
Richard Livingston³**

¹ Vitreous State Laboratory, The Catholic University of America, 620 Michigan Ave., NE Washington, DC 20064, ² University of Connecticut, 2152 Hillside Road, Storrs, CT 06269, ³ Office of Infrastructure R&D, HRDI-05, Federal Highway Administration, 6300 Georgetown Pike, McLean, VA 22101

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ABSTRACT

The glass corrosion field has developed an array of test methods that could be applied to fly ash pozzolanicity. These methods characterize various aspects of the corrosion process including ion leaching, hydration profile development and dissolution. They involve exposure to water under different conditions such as flow through or static closed system, and elevated temperatures. In this study synthetic fly ash glass specimens were used instead of real fly ash in order to provide standard and homogeneous compositions. Several accelerated leaching tests adopted from standard test methods for nuclear waste glass such as the Product Consistency Test (PCT), Vapor Hydration Test (VHT), and the Single Pass Flow Through Test (SPFT) were conducted. The glass samples were leached at high temperature (90 °C) for specified periods of time. Nuclear Resonance Reaction Analysis (NRRRA) was also applied to observe the hydrogen diffusion and ion exchange processes within the glass on a nanometer scale. Preliminary test results suggest that the sodium, alumina, and calcium uniformly are leached out after early leaching of sodium. Also, at the high pH levels prevailing in concrete, some crystalline phases and gel can accumulate on the glass surface which can inhibit further leaching.

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