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IMMOBALIZATION OF SPENT RESIN USING PALM OIL FUEL ASH (POFA) SUPPLEMENTED CEMENTITIOUS MATERIAL

The spent resin from the effluent treatment process and operation of the TRIGA PUSPATI reactor is one of the low level radioactive wastes managed by the national radioactive waste management centre at the Malaysian Nuclear Agency. This waste cannot be stored in its original form for a long period of time to avoid the radiological impact on humans and the environment. The spent resin used is Amberlite IRN 150 type, a spherical-shaped absorbent resin. Current work investigates the compatibility of palm oil fly ash (POFA) as the supplementary cementitious materials in the immobilization of spent resin in a cementitious matrix. POFA, an organic waste material from palm oil mills, has similar characteristics as other industrial supplementary cementitious materials normally in use. Other desirable features of POFA are low density and hardens quickly with minimal use of water. Therefore, the aim of the current work is to determine the optimum ratios of cement, POFA, and resin for the robust and durable radioactive waste immobilization system. The performance of the matrix system can be tested by compression tests following ASTM C-39/C39M-09a standards with maximum application stress of 2000kN. Characterization methods such as Field Emission Scanning Electron Microscope (FESEM), X-Ray Diffraction (XRD) Spectrometer, and CHNS analysis will be performed on the samples, hydrous or anhydrous to complement the mechanical data with a morphological and structural understanding of the system. Therefore, through this study, if the system can satisfy the waste form performance requirement in strength, waste loading, and slow leaching, the potential of POFA as an alternative supplementary cementitious material can be explored.

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