



Physicochemical, Radiological and Structural Properties Of Alkali Activated Materials – Future Trends And Applications

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The aim of this study was determination of physical-chemical, radiological and structural characteristics of kaolin, fly ash and the products of alkali-activated as well as thermally treated kaolin (alkali activated materials). Kaolin (raw material) and fly ash (industrial waste) used in the investigation showed the great potential for obtaining alkali activated materials as relatively new products to be used in construction and civil engineering as green cements. Physical-chemical and structural characterization was conducted using X ray diffraction (XRD), Fourier transform infra-red (FTIR) and X ray photoelectron spectroscopy (XPS), Scanning electron microscopy (SEM) and High-resolution transmission electron microscopy (HR-TEM). Activity concentration of naturally occurring radionuclides in kaolin, metakaolin, fly ash and alkali activated materials were determined. The absorbed dose rate (D) and the annual effective dose rate (EDR), were calculated in accordance to the UNSCEAR 2000 report. Kaolin was thermally treated on 750°C, and specific activity of natural radionuclides in metakaolin increased up to 1.6, while specific activities in alkali activated materials were significantly reduced.

Keywords: Alkali activated materials, kaolin, fly ash, XPS, HR-TEM, natural radioactivity