Estimation of Pozzolanic Activity of Scoria Rocks Using ASTER Remote Sensing

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Remote sensing, particularly through the Thermal Emission and Reflection Radiometer (ASTER) aboard the TERRA spacecraft jointly operated by Japan and NASA, presents a powerful means for gathering data essential for the targeted selection of scoria rock (SR) deposits. Leveraging informative radiance data captured by ASTER, reflective of various regions including those harboring SR, enables the conversion of radiance to reflectance. This study explores the correlation between the reflectance values at two effective ASTER Bands (B4 and B5) and the pozzolanic activity index (PAI) of ground SR samples measured within standard mortar mixtures. Through rigorous analysis, it is observed that SR samples exhibiting lower reflectance values are associated with higher PAIs, demonstrating a significant variation ranging from 91% to 100% at 28 and 90 days. By employing established mathematical correlation techniques, the reflectance values of distinct regions within the same geographical area as reported PAIs are derived and validated against existing data. The findings indicate a substantial agreement between the estimated and reported ranges of PAI values, affirming the efficacy of remote sensing methodologies in facilitating targeted SR procurement and correlating with critical material properties.