MS44-P02 | HYDRAULIC, STRUCTURAL AND PHOTOCATALYTIC BEHAVIOR OF CEMENTITIOUS PHASES INCORPORATING NANOCOMPOSITE MIXED ZN-AL-TI OXYDES

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The development of new modified cement-based materials has become a necessity for improving durability performance and removing pollutants from building surfaces. This research is focused on the synthesis, by co-precipitation method, of photocatalyst based on Zn-Al layered double hydroxides (LDH) impregnated by TiO_2 diluted in a basic solution of Na_2CO_3, to form, after calcinations, nanocomposite mixed Zn-Al-Ti oxides denoted C_Zn-Al-Ti, added to clinker pastes in proportion ranged from 0 to 5 wt %. The photocatalytic activity of C_Zn-Al-Ti nanoparticles as well as the mineralogical behavior of clinker pastes was evaluated. The memory effect of LDHs is evaluated by monitoring the hydration of the nanocomposite using X-ray diffraction. Characterizations of samples are following by X-ray diffraction, Fourier transform infrared spectroscopy and scanning electron microscopy. Degradation of Rhodamine B under UV light was selected as photocatalytic test reaction. The structures of the formed C-S-H show that the hydrates with the highest Ca/Si ratios having the shortest chains, and consequently the interlaminar spaces are smaller.The studied pastes showed that the synergistic effect between TiO_2 and Zn-Al-LDH contributes to overall photocatalytic performance due to the presence of C_Zn-Al-Ti in the matrix.