

Use Of Recovered Olivine-silica In Portland Cement Based Mortars

Vineet Shah¹

Allan Scott¹ and Christopher Oze²

¹ University of Canterbury

² Occidental College

Olivine is one of the most abundant mineral on the earth's surface with the general chemical composition of $(\text{Mg}^{2+}, \text{Fe}^{2+})_2\text{SiO}_4$. Numerous methods have been proposed to capture CO_2 using olivine resulting in the formation of stable magnesium carbonate and silica as by-product/residue. The silica obtained from olivine is reported to be amorphous and reactive in nature, and could be potentially used in numerous applications. In this study, the efficacy of the silica recovered from olivine is assessed for use as a supplementary cementitious material. Mortar samples were cast at 10 and 30% replacement levels of cement at water to binder ratio of 0.5. The performance of the recovered silica was compared with equivalent mortar mixes prepared using commercially available silica fume and fly ash. Mixes with recovered silica showed higher early and later age compressive strength.