

EFFECT OF SiO₂ ADDITION ON THE MINERALOGY OF EAF SLAGS

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Steel slags can be used as building materials due to their beneficial mechanical properties, e.g. for road construction (PASETTO & BALDO, 2011). However, steel slags also contain certain environmentally relevant elements, such as F, Cr, Mo and V. The project MiLeSlag connects the leachability of major and trace elements with the mineralogical composition of electric arc furnace (EAF) steel slags, since it is known from various studies that the leaching behaviour is linked to the mineralogy (HÖLLEN & POMBERGER, 2014). Therefore, pH dependence leaching tests have been conducted to evaluate the leachability of certain elements present in the slag. Furthermore, the leaching controlling phases have been modelled using the program LeachXS™ and were additionally compared with microscopic results of the investigation of the mineralogical phases composing the steel slag. Figure 1 illustrates the pH-dependent leaching of silicon of a re-melted original slag sample (A) and a conditioned re-melted slag sample (B). For conditioning, additional SiO₂ was added to the melt to tailor mineralogy for decreased leachability of V. Higher amounts of SiO₂ in the melt resulted in the formation of pyroxenes and olivine phases and the absence of larnite (i.e. belite: β-Ca₂SiO₄). The modelled results confirm the XRD analyses.

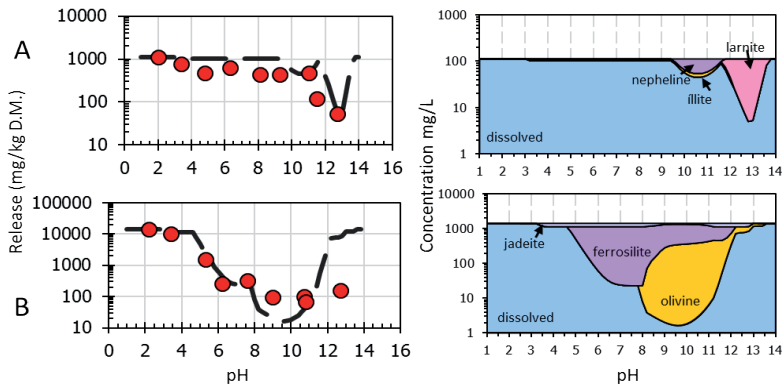


Figure 1: Left: pH-dependent release of silicon; Right: modelled phases controlling the leachability, A: re-melted original slag, B: conditioned re-melted slag.

PASETTO, M., BALDO, N. (2011): Constr. Build. Mater., 25, 3458-3568.

HÖLLEN, D., POMBERGER, R. (2014): Mineralische Nebenprodukte und Abfälle - Aschen, Schlacken, Stäube und Baurestmassen, 377-386.