APPLICATION NOTE

LIGHTIGO

Quantification of Chlorine in Concrete

Sample
Concrete samples

Mode of analysis
Quantification

Elements of interest
C, Ca, Cl, K, Na, S

Measurement rate
20 Hz

Reinforced concrete is the major material for civil engineering. It is used for many applications like bridges, highways, roads, tunnels, or marine structures. It means that any bigger damage to those structures influences transport or even normal life. So it is important to prevent those situations and elongate their lifetime.

The biggest danger for reinforced concrete is corrosion. Corrosion causes pits in reinforcement rods and it leads to losing strength. Two types of corrosion are known. The first type is chlorine corrosion caused by chlorine diffusion to the reinforcement and the second type is carbon corrosion, caused by carbon dioxide.

Problematic is also ingress of sulfates. The next problematic reaction is the alkali reaction caused by Na+ and K+. In comparison with other typical methods (potentiometry titration or ICP-OES), LIBS does not require complicated sample preparation. LIBS offers quick and in-situ multi-elemental analysis.

Applications can be illustrated by using a calibration model for the quantitative determination of chlorine (Fig. 1).

The concentration of chlorine is from 0.06 wt. % to 1.71 wt. %. This result can help with studying diffusion chlorine in time through the material. With this information, we will be able to react in time and prevent serious damages.

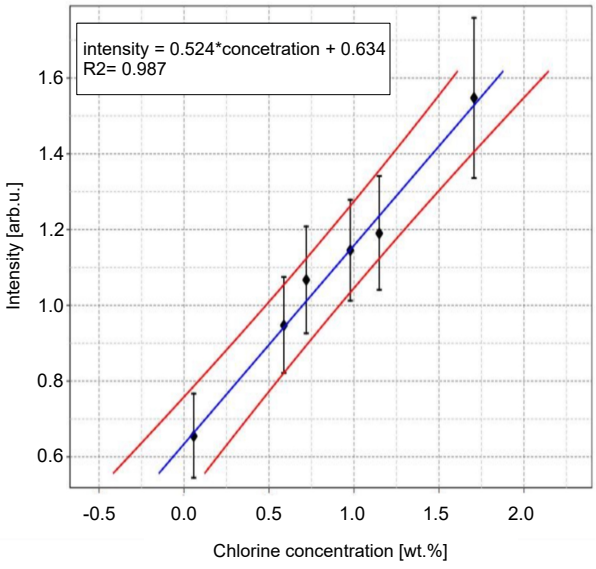

Fig.1. Calibration model of chlorine

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