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DISCUSSION

REPLY TO THE DISCUSSION ON THE PAPER "DELAYED ETTRINGITE FORMATION: THE EFFECT OF TEMPERATURE AND BASICITY ON THE INTERACTION OF SULPHATE AND C-S-H PHASE"[1]

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The authors would like to thank Dr. Chatterji for his interest in our paper and his pertinent comments. Such a contribution is highly appreciated.

We agree with Dr. Chatterji that the results reported may contain more information than we discussed, especially in relation to the disposition of the fixation sites on C-S-H.

Dr. Chatterji asks if the authors have carried out any work using Cl^- or NO_3^-. We also looked at the influence of the ionic charge of the electrolyte (Cl^-, SO_4^{2-}) in the presence of sodium hydroxide solution (0.1 mol/L). The isotherms obtained are presented in Figure 1.

It is found that the maximum amount adsorbed and the affinity of the ions for the surface increase strongly as the ionic charge increases. Figure 1 shows that in 0.1 mol/L NaOH solution, the maximum fixed SO_4^{2-} is 1.5 mmol/g C-S-H. For Cl^-, the maximum fixed is 0.15 mmol/g C-S-H. This last value also was reported by Tang and Nilsson (1). The relative ability of C-S-H to bind chloride has important implications for durability assessment.

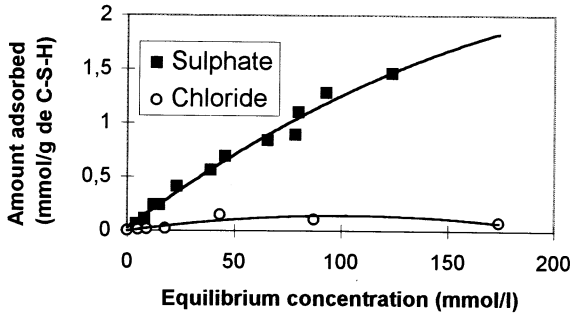

FIG. 1.
Adsorption isotherm of SO_4^{2-} and Cl^- ions on C-S-H in 0.1 mol/l NaOH at T = 25°C.

[1]Cem. Concr. Res. 28, 357–363 (1998).
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Numerous investigations have identified the Cl^-/OH^- ratio as an important indicator for determining the onset of depassivation of the steel in concrete. The experimental results show that the choride binding capacity of C-S-H is rather small.

From this work, it appears that the number of fixation sites on C-S-H, their disposition, and the physical adsorption mechanism (monolayer or multilayer) depend on the electrolyte concentration (Na^+, OH^-, Cl^-, SO_4^{2-}, . . .), the temperature, and, strongly, the ionic charge of the electrolyte.

Reference

1. L. Tang and L.O. Nilsson, Cem. Concr. Res. 23, 247 (1993).