Erratum to: Effect of chloride concentration and temperature on growth of 1D pit

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An error was found in equation 5 that was presented as;

$$D_{M+} \cdot C_{M+} = \frac{i_{\text{lim}} \cdot d}{F} = 2D_{\text{Fe}2+} \cdot C_{\text{sat-Fe}2+} \quad [\text{Eqn. 5}]$$

$$+ 3D_{\text{Cr}3+} \cdot C_{\text{Cr}3+} + 2D_{\text{Ni}2+} \cdot C_{\text{Ni}2+}$$

In fact, $D_{M+} \cdot C_{M+}$ and $\frac{i_{\text{lim}} \cdot d}{F}$ terms are not equal, and the correct equation should include electric charge ‘ n ’ on the left term as;

$$n(D_{M+} \cdot C_{M+}) = \frac{i_{\text{lim}} \cdot d}{F}$$

The corrected form of Eqn. 5, then, is written as;

$$n(D_{M+} \cdot C_{M+}) = \frac{i_{\text{lim}} \cdot d}{F} \quad [\text{Eqn. 5, corrected}]$$

$$= 2D_{\text{Fe}2+} \cdot C_{\text{sat-Fe}2+}$$

$$+ 3D_{\text{Cr}3+} \cdot C_{\text{Cr}3+} + 2D_{\text{Ni}2+} \cdot C_{\text{Ni}2+}$$

The molar ratio of Fe, Cr and Ni in S13Cr is 81:14:5, and, assuming congruent dissolution, the average value of n is therefore 2.14. The correction of equation 5 will affect equations 6 and 9 as follows.

$$D_{M+} \cdot C_{M+} = C_{\text{sat-Fe}2+}$$

$$(2D_{\text{Fe}2+} + 0.52D_{\text{Cr}3+} + 0.12D_{\text{Ni}2+}) \quad [\text{Eqn. 6}]$$

$$2.14(D_{M+} \cdot C_{M+}) = C_{\text{sat-Fe}2+}$$

$$(2D_{\text{Fe}2+} + 0.52D_{\text{Cr}3+} + 0.12D_{\text{Ni}2+}) \quad [\text{Eqn. 6, corrected}]$$

$$D_{M+} \cdot C_{M+} (\text{at } 85^\circ\text{C}) = 2.64D_{M+} \cdot C_{\text{sat-Fe}2+} \quad [\text{Eqn. 9}]$$

$$D_{M+} \cdot C_{M+} (\text{at } 85^\circ\text{C}) = 1.23D_{M+} \cdot C_{\text{sat-Fe}2+}$$

[Eqn. 9, corrected]

Corrected Eqn. 9 decreases the modeled $D_{M+} \cdot C_{M+}$ values in Fig. 9:

The online version of the original article can be found at <http://dx.doi.org/10.1007/s10008-015-2780-4>.

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Original (left) and corrected (right) Fig. 9

After correction, the calculated values of $D_{M^+} \cdot C_{M^+}$ were smaller than the experimental data in all NaCl concentrations, implying the modeled D_{M^+} and/or C_{sat} could be underestimated.

This issue will be addressed in a separate paper describing the re-analysis of the modeled D_{M^+} and C_{sat} for better fitting between experimental and modeled values of $D_{M^+} \cdot C_{M^+}$.