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BOOK OF ABSTRACTS

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PIII-48. Determination of Mean Ionic Activity Coefficients in the Li_2CO_3 - H_2O System at 25 °C and P_{CO2}=1 Atm

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The extraction of lithium from salt brines is one of the developing areas. For the proper selection of salt deposition conditions, experimental data on the thermodynamic properties of the phases and phase equilibria in a particular system are needed in order to build its thermodynamic model.

This work is related to the determination of mean ionic activity coefficient of Li_2CO_3 in the Li_2CO_3 – H_2O system. While the phase equilibria in this system have been investigated in a number of studies, almost no data on the thermodynamic properties of the solution Li_2CO_3(aq) phases. Measurements were carried out using the EMF method with ion-selective electrodes (CO_3^{2-} –ISE | Li_2CO_3 + H_2O | Li^+–ISE cell) in the 0.01 – 0.2 mol/kg molality range and t = 25 ^{0}C . Li^+,CO_3^{2-}–ISEs were calibrated in aqueous solutions of LiCl and $NaHCO_3$, respectively. After calibration, EMF measurements in the Li_2CO_3 - H_2O system were carried out.

At the first stage of the experiment, the pH values of solutions Li_2CO_3(aq) were measured with stirring and bubbling of CO_2 at p = 1 atm through the solution until equilibrium in the system was established. The criterion for achieving equilibrium state was considered a constant pH value of solution. At the next stage of the experiment, we measured the EMF between Li^+-, CO_3^{2-}- ISEs (see fig. 1) while passing CO_2 in the atmosphere above the solution. Further, since the obtained EMF are related with the mean ionic activity coefficient of Li_2CO_3 , experimental values were used to optimize the parameters of the Pitzer [1] model at 25 °C for the solution under investigation.

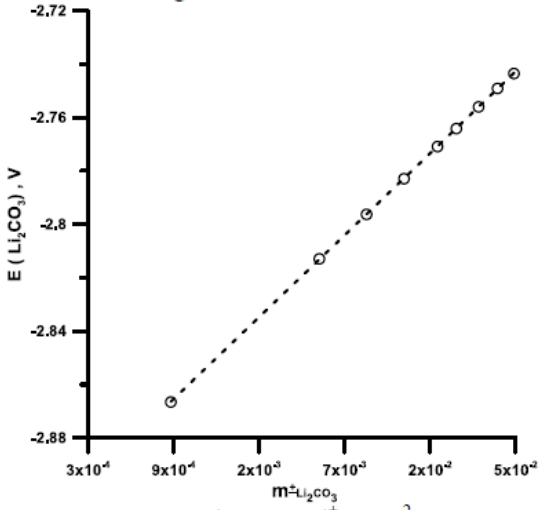

Figure 1. EMF between Li^+-, CO_3^{2-}- ISEs.

[1] C.E. Harvie, N. Moller, J.H. Weare, *Geochim. Cosmochim. Acta*, 1984, 48, 723.