A selection of thermodynamic properties for zeolites: application to the cement/clay interactions

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Deep disposal concepts are usually based on a multibarrier concept that may involve a physical contact between clayey and cementitious materials. In such context, zeolites are a group of important phases, which group most of the transition phases between cement and the clayey barrier since zeolites have been shown to form readily after the weathering of clays in a hyperalkaline environment [1]. Thermodynamic properties can be found in the literature for some of the zeolites of interest in deep disposal contexts. However, there is still a lack of consistency among the available thermodynamics datasets. A first task realized in the present work consists in a critical selection of the thermodynamic datasets published so far. The selection could be achieved with some confidence for a rather large list of minerals. Some questions and uncertainties still remain for phases like phillipsite, chabazite or gismondine.

Cases from the previous critical selection indicate the role of kinetics in the precipitation of zeolites, which can help in moderating the phase relations indicated by thermodynamics and can be related to field observations or experimental results. In addition, the concept of rock acidity can applied with success in order to investigate the phase relations between cements, zeolites and clayey materials.

[1] Gaucher and Blanc (2006) Waste Management **26**, 776-788