Metastable phase equilibria of the quaternary system KCl + K_2CO_3 + K_2SO_4 + H_2O at 273.15 K

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The Zabuye salt lake, located in Tibet, is famous for its high concentration of lithium, potassium and borate. During the process of natural evaporation, metastable phenomena existed in different degree. The metastable phase diagrams are the basis of comprehensive utilization of saline lake brine. In this paper, the solubility of the system was measured at 273.15 K using an isothermal evaporation method.

Figure 1 is the metastable phase diagram of the system at 273.15 K. The diagram consists of three crystallization fields corresponding to single salts $K_2CO_3 \cdot 3/2H_2O$, KCl and K_2SO_4, respectively. There are three univariant curves corresponding to curves AE, BE and CE, indicating the cosaturation of two salts. Invariant point E is saturated with salts $K_2CO_3 \cdot 3/2H_2O$, KCl and K_2SO_4. The crystallization field of K_2SO_4 is the largest, and the crystallization field of K_2CO_3 is the smallest. These results indicate that salt K_2SO_4 is easy to be saturated and crystallized from the aqueouse solution coexisting with sulphate, chloride and carbonate of potassium.

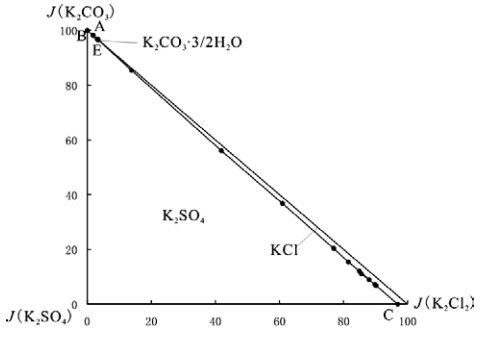

Figure 1. Metastable phase diagram of the quaternary system $K^+//Cl^-$, CO_3^{2-}, SO_4^{2-}-H_2O at 273.15 K

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Comparing the fate of lignin in dissolved and particulate organic matter of Ganges–Brahmaputra river system

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Rivers deliver huge amounts of terrestrial organic carbon (OC) into oceans in both dissolved and particulate form. The fate of dissolved organic matter (DOM) and particulate organic matter (POM) may vary due to different degradation pathways and physical protection mechanisms. Determining the composition and residence time of DOM and POM during riverine transport is crucial for understanding the role of terrestrial OC in global carbon cycling. As a uniquely terrestrial biomarker, lignin serves as an effective tracer of vascular plant OM in river DOM and POM. While it has been established that lignin is a prominent component of POM and is widely dispersed by rivers, much less is known about the fate of lignin in the dissolved form. Here we investigate the abundance and composition of lignin-derived phenols in the DOM and POM from the Ganges-Brahmaputra river system. Lignin phenols were liberated from POM collected on filters and from DOM collected on C_{18} solid-phase cartridges using the CuO oxidation method. We compared the abundance, composition, and degradation stage of lignin phenols to assess lignin fractionation and degradation in the dissolved and particulate phases during the land-river transport. Furthermore, we collected large-volume samples of riverine DOM and POM in order to isolate sufficient quantities of lignin phenols by high pressure liquid chromatography for compound-specific radiocarbon and stable carbon isotopic analysis. The radiocarbon age of dissolved lignin versus lignin in sedimentary particles provides insights on the fate and transport of terrestrial organic matter within fluvial systems.