

## Solubility experiment in subsystems of Sr-Ca-Mg-Cl-H<sub>2</sub>O at 298 K

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Celestite is the most important strontium containing mineral in nature. There are many celestite resources distributed in the provinces of Hubei, Qinghai, Sichuan, and Yunnan in China<sup>[1]</sup>. During the past decade, China's strontium sector developed quite rapidly, while after more than 20 years of exploitation, most of the high-grade resources had been depleted, and the deposit of strontium tailings was more serious. Commonly, the utilization rate of strontium is usually below 75 %, which caused huge waste of the resources waste. In the technology of extraction strontium from strontium tailings leaching solution which uses HCl as lixiviant, the main components of the leaching solution can be described with the system Sr<sup>2+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup> // Cl<sup>-</sup> - H<sub>2</sub>O. In the system mentioned above, many types of hydrate salt, double salt, and solid solution can be formed.

Phase equilibria is of a particular importance for the purification of chemical produces, element geochemistry and element cycles<sup>[2]</sup>. Accordingly, the phase equilibria of three subsystems of Sr<sup>2+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup> // Cl<sup>-</sup> - H<sub>2</sub>O at 298 K have been done by using isothermal dissolution method and Schreinemakers wet residues method. Results show that: (1) system Sr<sup>2+</sup>, Mg<sup>2+</sup> // Cl<sup>-</sup> - H<sub>2</sub>O belongs to simple type with two single salts SrCl<sub>2</sub>·6H<sub>2</sub>O, MgCl<sub>2</sub>·6H<sub>2</sub>O formed. (2) system Sr<sup>2+</sup>, Ca<sup>2+</sup> // Cl<sup>-</sup> - H<sub>2</sub>O belongs to complex type with one solid solution [Sr, Ca]Cl<sub>2</sub>·6H<sub>2</sub>O formed, and the solid solution has the largest crystallization field occupies 50 % phase region. (3) system Ca<sup>2+</sup>, Mg<sup>2+</sup> // Cl<sup>-</sup> - H<sub>2</sub>O belongs to complex type with double salt 2MgCl<sub>2</sub>·CaCl<sub>2</sub>·12H<sub>2</sub>O formed, and the solid solution has the largest crystallization field.

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