Study on Sintering System of Calcium Barium Sulphoaluminate by XRD Quantitative Analysis

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Abstract : Calcium barium sulphoaluminate (CBSA), derived from calcium sulphoaluminate(CSA), has excellent cementitious properties. In this study, the sintering system of CBSA with a theoretical stoichiometric Ca3BaAl6SO16 was investigated. Rietveld refinement was performed using TOPAS 4.2 software to quantitatively calculate the content of CBSA and the actual ionic site occupancy of Ba2+. The results indicate that the contents of Ca4-xBaxAl6SO16 increases with increasing sintering temperature in the 1200°C-1400°C ranges. When sintered at 1400°C for 180min, the content of CBSA reaches 88.4%. However, CBSA begins to decompose at 1440°C and the content of which decreases. The replacement rate of Ba2+ was also enlarged by increasing sintering temperature and prolonged sintering time. Sintering at 1400°C for 180min is considered as the optimum when replacement rate of Ba2+ and the content of CBSA were taken into account. Ca3.2Ba0.8Al6SO16 with a content of 88.4% was synthesized.

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