

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 $\text{Ca}_3\text{BaAl}_6\text{SO}_{16}$ 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 Ba^{2+} . The results indicate that the contents of $\text{Ca}_{4-x}\text{Ba}_x\text{Al}_6\text{SO}_{16}$ 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 Ba^{2+} 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 Ba^{2+} and the content of CBSA were taken into account. $\text{Ca}_{3.2}\text{Ba}_{0.8}\text{Al}_6\text{SO}_{16}$ with a content of 88.4% was synthesized.

Keywords : calcium barium sulphoaluminate, sintering system, Ba^{2+} replacement rate, Rietveld refinement

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