



硬石膏胶结材水化硬化研究

Research on the hydration and hardening characteristics of anhydrite binder

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中文摘要

通过硬石膏水化率、水化温升、液相离子浓度测定,结合宏观性能试验,对硬石膏基胶结材水化硬化历程,硫酸盐激发剂作用机理,矿渣对硬石膏的改性作用进行了研究。硫酸盐促进硬石膏溶解,提高液相浓度和过饱和度,加快二水石膏晶体成核与生长速率;矿渣水化形成钙矾石与水化硅酸钙等水硬性矿物,使硬石膏硬化体强度与耐水性提高,矿渣水化与硬石膏水化相互促进;采用硫酸盐激发、矿渣改性的硬石膏基胶结材具有强度较高、耐水性较好、干缩率较小的特点,其水化硬化经历了快速溶解反应期、水化潜伏期、加速水化期、稳定水化期和缓慢水化期等五个阶段。胶结材凝结时间决定于潜伏期,加速水化期和稳定水化期是硬化体结构致密和强度发展的主要阶段。

英文摘要

In this paper, the hydration and hardening process of anhydrite binder, the activating mechanism of sulfate salt typed activator, and the modifying effects of anhydrite with slag were studied through the determination of hydration rate, temperature-rises and ion concentration in liquid phase of anhydrite, combined with the macro-performance measurements. The addition of sulfate salt promotes the solution of anhydrite, increases ion concentration and supersaturation degree in liquid phase, accelerates the gypsum crystal nucleation and growth. The hydration of slag forms water rigid minerals such as ettringite and hydrated calcium silicate, and the strength and water-resistance of the anhydrite binder material are accordingly increased. Anhydrite binder material activated by sulfate salt and modified with slag has good characteristics such as higher strength, good water resistance and low shrinkage rate. Its hydration and hardening experience five stages such as rapid dissolution, latency period, hydration accelerated period, domain hydration period and slow hydration period. The setting time of binder material depends on latency period, and the densification and strength development of the hardened anhydrite paste is mainly concentrated at the stage of hydration accelerated period and stable hydration period.

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