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非离子型表面活性剂对铝酸钠溶液晶种分解的影响

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摘要: 采用对比实验法研究非离子型表面活性剂对铝酸钠溶液晶种分解率及其产品粒度和形貌的影响。结果表明: 添加某非离子型表面活性剂, 用量在100~150 mg/L范围内, 可提高分解率6%左右; 粒度分析及电子显微镜形貌观察表明非离子型表面活性剂可促进Al(OH)₃晶体的附聚和抑制二次成核, 产品平均粒径可提高16 μm。对表面活性剂强化铝酸钠溶液晶种分解的机理研究表明, 表面活性剂改变Al(OH)₃颗粒的表面Zeta电位, 同时使铝酸钠溶液的表面张力降低了20~30 mN/m, 从而可大幅度降低铝酸钠溶液的稳定性, 加快晶体生长速度。非离子型表面活性剂能有效强化铝酸钠溶液晶种分解过程。

关键字: 铝酸钠溶液; 表面活性剂; 强化; 晶种分解

Effect of nonionic surfactant on seeded precipitation of sodium aluminate solution

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Abstract: The effects of a nonionic surfactant on the seeded precipitation rate of sodium aluminate solution, the particle size and morphology of the products were studied. The results show that when the added amount of the nonionic surfactant ranges from 100 mg/L to 150 mg/L, the seeded precipitation rate can be raised by about 6%, and its accelerating effects on the agglomeration of Al(OH)₃ crystals and inhibiting secondary nucleation are also found in terms of the particle size distribution and SEM, which results in the increase of the average radius of products by 16 μm. The mechanism of the surfactant behavior was discussed. The results indicate that the Zeta potential of Al(OH)₃ particle is changed and surface tension of sodium aluminate solution decreases by 20–30 mN/m with the addition of surfactant, which makes the stability of sodium aluminate solution greatly decline. Therefore, the nonionic surfactant can effectively intensify the seeded precipitation process of sodium aluminate solution.

Key words: sodium aluminate solution; surfactant; intensification; seeded precipitation

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