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硫酸-水玻璃体系的成胶特点

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摘要 研究了用溶胶凝胶和常压干燥的方法制备SiO 2气凝胶粉体时，硫酸-水玻璃体系的成胶规律，发现凝胶时间与体系的pH值有较大的关系；在反应物浓度一定的条件下，凝胶时间 t-pH曲线成“W”型，随反应物浓度的降低，逐渐向“U”型曲线转变；体系凝胶时间最快点的pH值，在碱性环境中随反应物浓度的减小而降低，在酸性环境中随反应物浓度的减小而增大；这与在碱性和酸性环境中所存在的两种成胶机理有直接的关系。 甲酰胺的引入不会明显改变硫酸-水玻璃体系的成胶特点，但明显改善了SiO2气凝胶的物理性能。

关键词 SiO2气凝胶；水玻璃；溶胶凝胶

分类号

Characteristics of gelation process of H2SO4-waterglass system

Abstract

The preparation of silica aerogelat ambient pressure from waterglass is a promising methodThe gelation process of H 2SO 4-waterglass system was investigated，and was used to prepare SiO 2 aerogel powdersThe results indicate that the pH value had a strong impact on the gelation time of H 2SO 4-waterglass systemFor the system with constant reactant concentrations，the relationship between gelation time and pH value showed a “W” shape curve，which changed gradually to “U” shape when the reactant concentration decreased continuouslyThe pH value of the sol system with the shortest gelation time decreased in basic condition（pH≥7）and increased in acidic condition（pH＜7）with decreasing reactant concentrationsThe two different gelation mechanisms of H 2SO 4-waterglass system in acidic and basic conditions should be responsible for this variationAddition of formamide did not change obviously the gelation characteristic of H 2SO 4-waterglass system，but improved remarkably the physical properties of resultant silica aerogel.

Key words silica aerogel waterglass sol-gel

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