Abstract

Silanization is a critical process for modifying silica surfaces to alter their interaction with water, impacting various applications from coatings to sensor technologies. This research investigates the wettability of porous silica beads and slides post-silanization using Methacryloxypropyltrimethoxysilane (MPTMS) in an anhydrous environment. We explore the effect of silane concentration, solvent choice, and heat treatment temperature on the process efficacy. Thermogravimetric Analysis (TGA) assesses the composition changes and bonding effectiveness, while adsorption-desorption isotherms correlate wettability with water vapor adsorption on treated surfaces. The contact angle measurements provide a quantitative analysis of the hydrophobicity induced by silanization, revealing a surface with poor wettability characteristic of hydrophobic functional groups. Our results, including a significant water vapor adsorption observed at higher pressures, suggest successful silanization and provide insights into optimizing the coating process for future researches.