

The Release Behavior of Grafted Cinnamon Bark Oil on Fumed Silica Surface

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In this study, we used 3-Glycidyloxypropyl triethoxysilane coupling agent for surface modification of fumed silica particles. We studied effects of reaction conditions such as pH of solvent, hydrolysis time of GPTMS, reaction time, and molar ratio of GPTMS to Si-OH groups on fumed silica particles surfaces. The particles were firstly treated with a silane coupling agent to introduce epoxy groups as the growth points, and then grafting of the cinnamon bark oil were started from the modified surface of Silica. FT-IR, TGA, EA techniques were used to determine the type and the degree of surface modification. The release behavior of cinnamon bark oil from a fumed silica particles was investigated by gas chromatography/mass spectrophotometry. The diffusion and releasing kinetics of cinnamon bark oil from mesoporous material were obtained by analyzing the simple exponent type of time dependent on fractional mass release equation. The diffusion coefficient of essential oil was estimated from the experimentally observed cinnamon bark oil emission behavior. The emission mechanism was influenced by controllable experimental variables, such as matrix grafting ratio and oil, silane mass method.