

Preparation of Multifunctional Silica Particles using Barrier from Polystyrene Particles

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In this research, multifunctional silica particles were prepared using polystyrene(PS) particles barrier. Silica particles were prepared by sol-gel method and PS particles were prepared by batch emulsion polymerization. Using a droplet of PS/water suspension, PS particles were arrayed by spin coating on the silicon wafer. On the PS/wafer substrate, a droplet of silica suspension was dropped and coated by spin coating. By heating above the glass transition temperature of PS, the barrier was formed and then it blocked the part of silica particles. Dipping the silica/PS/wafer substrate in the mixture solution of DI water, ethanol, and ammonium hydroxide, the introduction of organic chains on the unblocked surface of the silica were performed. During the reaction, the organo-silane compound was added to the mixture solution using micro feed pump. After the reaction, PS barrier was taken off from the surface of the silica particles and through the centrifugation the modified silica particles were gained. The characterizations of the particles were performed by SEM, ^{13}C solid-state NMR, water contact angle(WCA) measurements.