

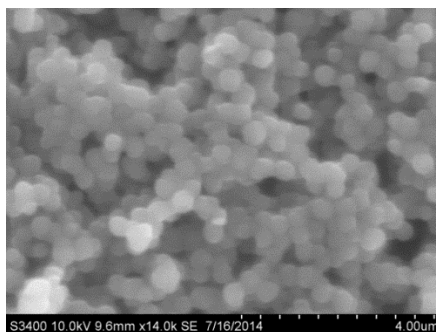
Surface modification of the silica particles with different functional groups

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Silica spherical particles have been obtained by the sol-gel method using tetraethoxysilane (TEOS) or tetramethoxysilane (TMOS). Synthesis reaction temperature, different solvents (methanol, ethanol, 2-propanol) and other factors allow to obtain uniform silica particles with the diameter size from 40 to 500 nm. Next, such obtained particles were modified with various functional groups in the condensation reaction between hydroxyl groups come from silica particles surface and hydrolyzed silica precursors with proper groups (for example: 3-aminopropyltriethoxysilane, 3-mercaptopropyltriethoxysilane, vinyltriethoxysilan, 3-glycidoxypropyltrimethoxysilane and similar). Silica particles were grafted with functional groups in order to provide covalent anchoring points for other chemical and biological species (enzymes, peptides, antibody, DNA, drugs). Silica particles are researched as a potential multifunctional drug delivery system which can deliver active substance to the described places of organism [1-3].

Summerized silica particles with amina, thiol, vinyl, methyl, isocyanato, phenyl and other groups were synthesized. The presence of the functional groups were confirmed by the Raman and IR spectroscopy. Size, shape and dispersion state of the particles were described using SEM (scanning electron microscopy) and TEM (transmission electron microscopy). The changes in the Zeta potential value caused by the connected functional groups were measured by the Nanosizer.



SEM micrograph of the silica particles with amina groups.

References:

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