

## Preparation of Highly Monodisperse Small Silica Particles Using Amino Acids and Controlled Regrowth Reaction

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The need for monodisperse silica particles with various sizes is constantly increasing in optical and biological industries due to their wide range of applications such as colloidal photonic crystals, light diffusers and biological probes. Our preparation method of silica particles is analogous to the so-called "Stober method", but amino acid monomers have been used in place of ammonia anhydrous and reaction was taken in oil/water 2 phase system with high temperature. Hydrolysis and condensation reactions of tetraethyl orthosilicate as a silica precursor were carried out in the presence of L-arginine. Hydrogen bonding between L-arginine molecules probably contributed to charge stabilization of silica particle. The reaction parameters had been optimized to produce about 20nm silica seeds with high reproducibility and precisely controlled size range from 40nm to 130nm of the silica particles could be obtained by using a regrowth procedure in the same reaction media. Furthermore, these silica particles could be successfully used as seeds in the conventional Stober method of regrowth for size range from 150nm to 2 $\mu$ m.