

Controllable design of aminosilica microparticles for multi-uses

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During the past decade, silica particles with amino groups have been broadly investigated [1-3] and now they are a commercial product of various chemical companies, including Sigma Aldrich. Their application for solving many practical problems, including such global as ecological, energy-saving and medical, has attracted attention of scientists to their synthesis and study. Also, aminosilica particles are important due to their economic efficiency and eco-friendliness. We optimized the reaction conditions between silica structuring agent and 3-aminopropyltriethoxysilane leading to the control of the main characteristics of the particles such as size, porosity, amino groups content and availability, zeta potential. It could be achieved by introduction of alkyl-containing silanes, adjustment of reagents ratio, temperature, reaction timing and catalyst. Besides, as advanced nanomaterial, bifunctional nanoparticles exhibit special properties because they integrate the benefits of two types of ligands, amino group and organic group. Such bifunctional microparticles manifested excellent performance when applied in metal ions [4-5] or dyes adsorption [6], antibacterial activity assay [5,6]. Overall, further elaboration of this research direction is a challenging task.

Acknowledgements

I.V. Melnyk and M. Vaclavikova are grateful for the financial support from the project VEGA 2/0156/19.

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