AN ATTEMPT TO SYNTHESIZE MESOPOROUS SILICA BY A DIFFERENT SILICA PRECURSORS AND POROGENS

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Mesouporous materials plays an important role in material science, especially in sample preparation techniques like solid phase extraction and solid phase microextraction. Solid phase extraction and microextraction relies on interaction between two different phases – a solid sorbent and a liquid or a gas so it is important that the solid sorbent has a high surface area. This can be achieved by making a materials with porous structures. These materials are classified into three categories: microporous, mesoporous, and microporous materials. Mesoporous materials, compared with other two types of porous materials, comes with a big advantages: narrow pore size distribution and high surface area, can be made with different materials such as silica or various metal oxides, have biocompatibility and low toxicity.

Silica is a perfect candidate for mesoporous sorbents – it can be easily modified and has a rather good chemical stability against organic solvents. Usually, the synthesis of mesoporous silica sorbent starts with a silica source (typically TMOS or TEOS orthosilicates) porogen and a catalyst. After the reaction, organic porogen is removed by heating or using a solvent extraction method. The latter steps involve surface modification via variable reactions which can give a desired functionality and selectivity.

It this study we tried to make mesoporous silica via different synthesis methods that involved: three different silica sources (TMOS, TEOS and APTES), different reaction catalysts (acid, urea and self-catalysis) and two different porogens P123 and CTAB. The synthesis methods were selected and modified according to the porogens used in the original scientific publications.