

ONE-POT APTES GRAFTED SILICA SYNTHESIS AND MODIFICATION WITH AGNP

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Mesoporous materials play an important role in material science, especially in sample preparation techniques like solid phase extraction and solid phase microextraction. Mesoporous materials, compared with other two types of porous materials (micro and macroporous), 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. The latter steps involves porogen removal and surface modification with the desired functional groups or nanoparticles.

In this study we synthesized two types of silver nanoparticles (AgNP) modified silicas with different porogens (CTAB and P123) and TMOS and APTES as a silica sources. AgNP presence was confirmed with EDX and SEM analyses, porosity and surface area were assessed with nitrogen sorption desorption analysis. FT-IR analysis was also performed on synthesized silica samples. AgNP load (compared to silicon) was around 40-50 % for both silicas. BET surface areas: 344.6 and 8.8 m²/g for silicas, synthesized using CTAB and P123 as a porogens. Nitrogen sorption-desorption analysis showed better porosity for CTAB silica with mesopores, ranging from 2 to 45 nm in size.