Supplementary information

**Deposition of silver nanoparticles on organically-modified silica in the presence of lignosulfonate**

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**Silica support characterization**

The size of particles was determined by a Zetasizer Nano ZS instrument (Malvern Instruments Ltd., UK) using the NIBS method. The surface morphology and microstructure of the product obtained were examined on the basis of the SEM images recorded on EVO40 electron scanning microscope (Carl Zeiss AG, Germany). The elemental composition of the products was established using a Vario EL Cube instrument (Elementar Analysensysteme GmbH, Germany), which is capable of recording the percentage content of carbon and hydrogen in sample following high-temperature combustion. The silica obtained was also subjected to determination of their surface area (BET) and total volume of pores as well as mean size of pores using the method of Barrett, Joyner, Halenda (BJH). The measurements were performed on ASAP 2020, made by Micromeritics Instrument Co., USA.
Fig. S1 Particle size distribution (a) and SEM image (b) of silica obtained by the modified Stöber method.

Table S1 Elemental content and porous structure properties of Stöber silica

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<tr>
<th>Elemental content / %</th>
<th>Porous structure properties</th>
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<tr>
<td></td>
<td>$A_{BET}/m^2/g$</td>
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<tr>
<td>C 0.15</td>
<td>H 1.30</td>
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Lignosulfonate adsorption on organically modified silica

The efficiency of the adsorption of lignosulfonate on both unmodified silica and grafted-silica with selected organic groups was studied by recording the UV-Vis spectra of a lignosulfonate solution before and after adding of silica sample. To promote the adsorption the solution of lignosulfonate with added amounts of silica was agitated by ultrasound. It was then centrifuged and the absorbance of the supernatant was compared with the absorbance of the control solution.

Fig. S2  UV-Vis spectra of lignosulfonate solution before (control) and after contact with solid silica samples (see experimental section for abbreviations).