

Cellulose hydrolysis using Ag exchanged in mesoporous mordenite

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This work presents the study of catalysts based on Ag exchanged in mesoporous mordenite used to complete the hydrolysis of oligomers derived from the solubilization of cellulose in supercritical water. The synthesized mesoporous zeolitic support showed a significant increase in pore volume and size in comparison to the original zeolite. The incorporation of Ag did not significantly modify the pore size, which allows the voluminous oligomer molecules to reach the active centers. By means of characterization techniques, the presence of Ag (I) ions in interaction with the structure was detected. Through adsorption and desorption of NH₃ it was determined that silver species favor the formation of strong acid sites. During the exchange of Na (I) by Ag (I) ions are also produced protons H⁺ (acid medium) which are located in the network and confer moderate acidic character. The combination of a mesoporous zeolite with Ag (I) ions allowed almost complete hydrolysis of the cellulose (81.8%) with a yield of glucose of 43.5%. Thus, the presence of Ag modified the acid-base properties improving the hydrolysis of cellulose.