

Supporting Information

Pretreatment of microcrystalline cellulose by ultrasounds: a green tool for enhancing the catalytic hydrolysis of cellulose to glucose

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General procedure for the decrystallization of AVICEL PH-105 in ionic liquids

100g of ionic liquid (e.g. [BMIm]Cl, [EMIm]Et₂PO₄, and [BMIm]AcO, respectively) were first heated at 80 °C in a 250 mL glass reaction vessel with a magnetic stirring bar prior to the addition of 5 g of Avicel PH-105. After about 3 h, the Avicel PH-105 cellulose was completely dissolved. At this stage, the hot solution was poured into 500 mL of 95% ethanol with rapid agitation to induce the precipitation of dissolved Avicel PH-105 cellulose. The resulting slurry was filtered and the recovered Avicel PH-105 cellulose was redispersed in 500 mL of additional ethanol. Filtration and redispersion steps were repeated for three times and the filter cake was dried under vacuum at 40 °C to yield a free-flowing powder product, i.e. IL-pretreated cellulose.

Titration of AC-SO₃H

0.2 g of AC-SO₃H was suspended in 20mL of an aqueous solution of KCl (0.1mol/L) and stirred for 30 min. Titration of the resulting solution was then carried out with a solution of KOH (0.02mol/L) and the pH evolution was monitored by a Metrohm pH meter.

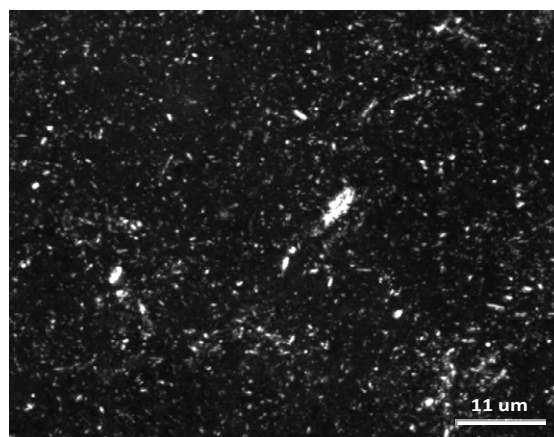


Fig. S1 Images of SC particles suspended in water recorded by confocal microscopy.

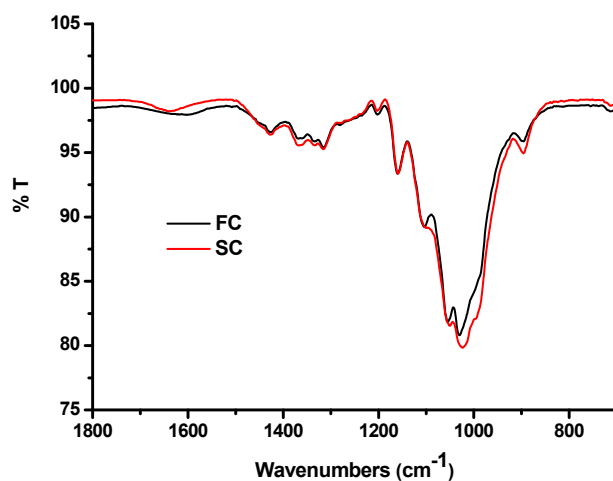


Fig. S2 FT-IR spectra of FC and SC in the range of 1800-700 cm^{-1} .

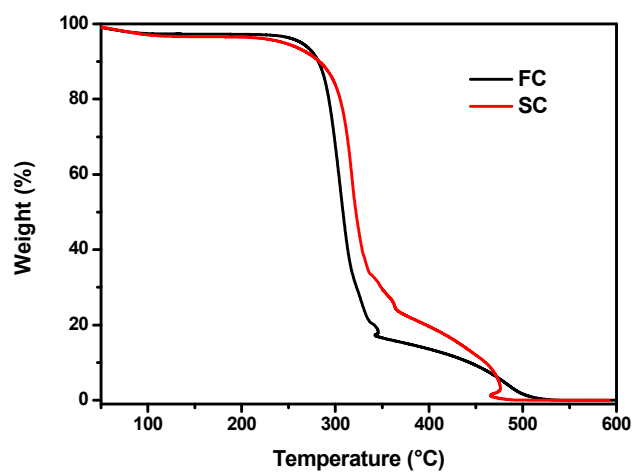


Fig. S3 Thermogravimetric analysis of FC and SC.

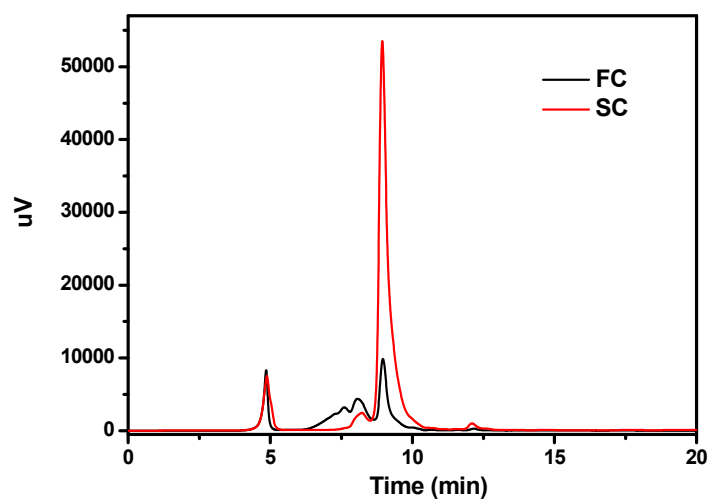


Fig. S4 Catalytic hydrolysis of FC and SC over AC-SO₃H catalyst. Both chromatograms were recorded at similar concentration of TRS in order to highlight the efficiency of ultrasound

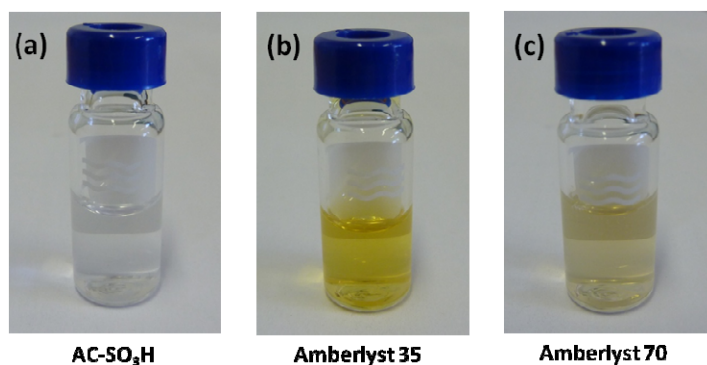


Fig. S5 Pictures of the aqueous phase recovered after catalysis over (a) AC-SO₃H, (b), Amberlyst 35 and (c) Amberlyst 70