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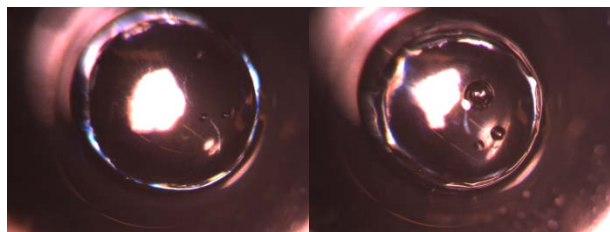
ARTICLE TYPE

Supporting information

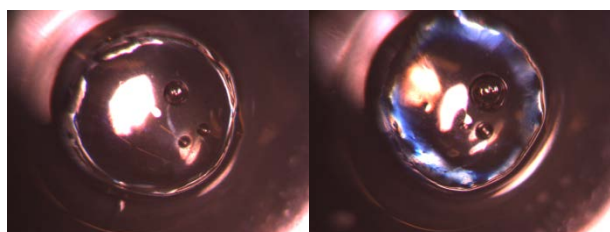
The formation of the cellulose capsule

A droplet of dissolved cellulose containing CO₂ was dripped into a water bath and then continuously imaged as a function of time, representing the formation of the hollow cellulose spheres. Initially small droplets of CO₂ can be seen which grows in size with time. Eventually one large gas droplet can be seen in figure J. After 1.5 hours (figure K) it clearly shows that water has penetrated into the shell and dissolved the majority of the CO₂, with only a small CO₂ droplet that later on, figure L, is completely removed leaving a cellulose shell with encapsulated water.

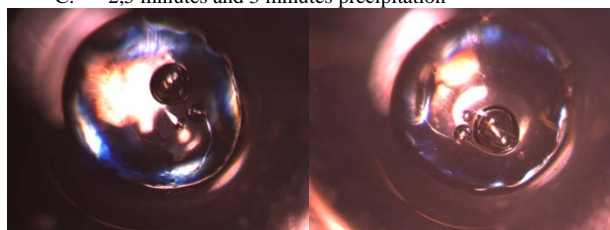
A. 10 and 40 seconds after precipitation



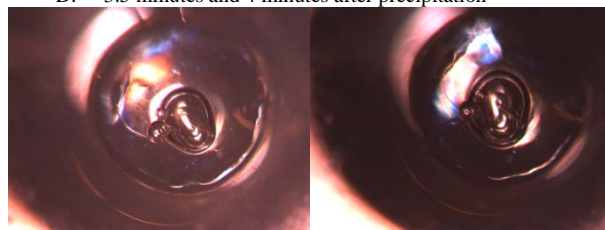
B. 70 seconds and 2 minutes after precipitation



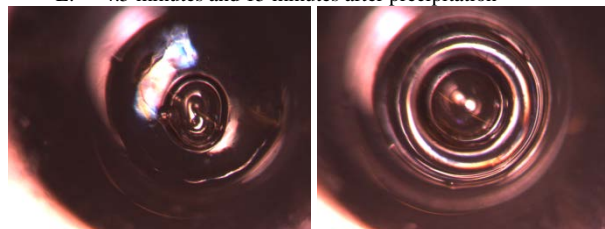
C. 2.5 minutes and 3 minutes precipitation



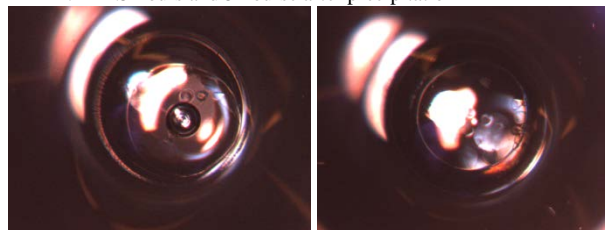
D. 3.5 minutes and 4 minutes after precipitation



E. 4.5 minutes and 15 minutes after precipitation



F. 1.5 hours and 5 hours after precipitation



Size distributions

The distribution of the total cellulose capsule volumes is presented in figure 2 and the distribution of the void space volumes is presented in figure 3.

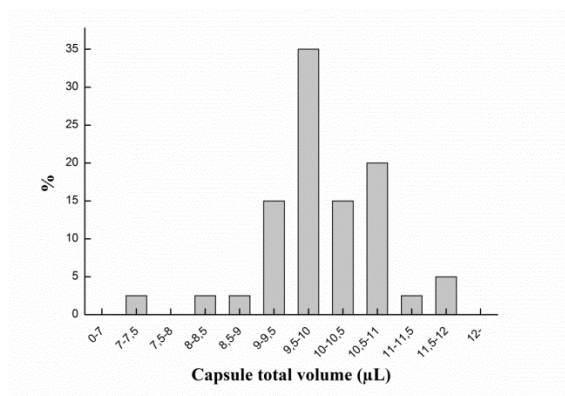


Figure 2. The distribution of capsule total volume for the formed capsules. The capsules were prepared using 0,1 MPa gas pressure and 30 min dissolution time, the capsules were degassed in deionized water at 25 °C and a non-modified cellulose with a charge density of 29 μeqv./g was used in these experiments.

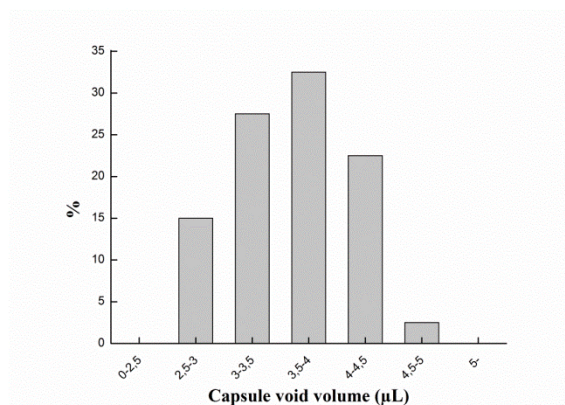


Figure 3. The distribution of the cellulose capsule void space of 40 cellulose capsules. The capsules were prepared using 0,1 MPa gas pressure and 30 min dissolution time, the capsules were degassed in deionized water at 25 °C and a non-modified cellulose with a charge density of 29 μeqv./g was used in these experiments.

Solid state NMR

From solid state NMR experiments (figure 2) it is clear that the cellulose capsules are completely non-crystalline with an estimated crystallinity significantly lower than 1 %.

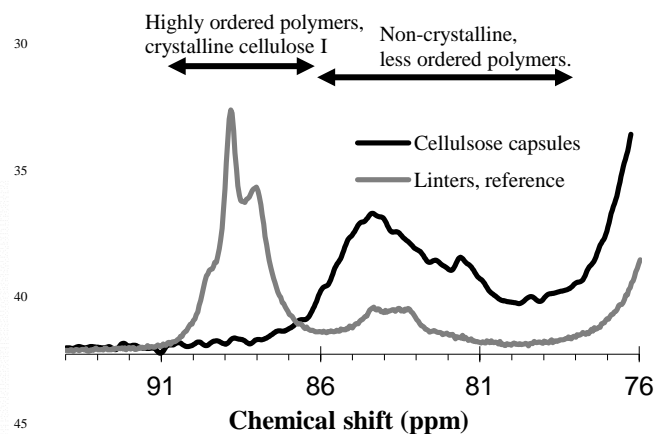


Figure 4. Solid state NMR on never dried cellulose capsules prepared from 1 % cellulose solution. The CO₂ pre-treatment time was 30 minutes. The hollow cellulose spheres were prepared at 0.1 MPa CO₂ with non-modified cellulose with a charge of 29 μeqv./g.