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Preparation and production of cellulose particles for novel applications

New products in various areas, e.g. pharmaceuticals, petrochemistry, nanotechnology, and pulp industry, are based on either cellulose itself or more commonly on its derivatives. However, production of proper cellulose material is rarely pollution free. My research aims at less pollutive and environmentally friendly cellulose platform which can easily be tailored for the purposes of modern applications. Controllable characteristics of beads and particles are:

- Size
- Shape factor
- Surface chemistry
- Morphology
- Degree of crystallinity
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The current methods to prepare particles include pollutive viscose process. Carbon disulfide CS_2 is produced and enormous amount of sulfuric acid H_2SO_4 is used. We are investigating new sustainable alternatives to dissolve and coagulate cellulose from water-based systems.

So far a proper pre-treatment method has been found and tested to make cellulose soluble in water-based solvent. Also coagulation parameters have been studied intensively and cellulose beads have been improved in many ways compared to beads produced from viscose. In the future, characterization and tailoring the beads take place. Aim is to produce beads with well controlled characteristics to suit novel applications.