

Method for the evaluation of the dissolution power and dissolution quality of cellulosic raw materials dissolved in new Ionic Liquids

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The Lyocell process is a technology where cellulose is dissolved directly to obtain spinning dopes for man-made cellulosic fiber manufacturing. Besides the conventionally used N-methylmorpholine N-oxide (NMMO), some ionic liquids (ILs) have excellent dissolving properties for cellulosic raw materials. In particular, the new class of superbase-based ILs is on the threshold of industrial implementation [1].

In this presentation a systematic approach for evaluating the dissolution power of new ILs for cellulosic raw materials is described. More specifically, a set of analytical methods for the determination of the raw material quality is presented. In a next step, the dissolution speed and other qualities of new ILs are listed. For the assessment of the spinning dope quality, in terms of the Lyocell process, the use of different analytical methods like polarization microscopy, determination of DP, determination of solid content, rheological analysis and particle characterization by laser diffraction are also included. In summary, a comparison of the dissolution power of selected new ILs with those of the conventional solvent NMMO is made.

[1] S. Elsayed, J. Helminen, S. Hellsten et al., "Correction to "Recycling of Superbase-Based Ionic Liquid Solvents for the Production of Textile-Grade Regenerated Cellulose Fibers in the Lyocell Process"," ACS Sustainable Chemistry & Engineering, vol. 8, no. 49, p. 18345, 2020.