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IDENTIFICATION AND QUANTIFICATION OF CELLULOSE MODIFICATIONS

Cellulose depending on its origin, treatment and processing is available in different crystalline modifications. By high-resolution ^{13}C solid state NMR spectroscopy, particularly the CP/MAS method (cross polarization, magic angle spinning) these modifications can be identified by their typical ^{13}C spectrum. In blends of these modifications which develop e.g. in an incomplete transformation during a chemical treatment contents of the individual phases can be determined by a quantitative spectra analysis. In figure 1 the spectra of natural cellulose I, cellulose II and 2 samples with different ratios of cellulose I to cellulose II are shown. They were produced by an incomplete transformation of cellulose I in alkalization reactions with caustic soda solution of different concentration and subsequent regeneration. Such measurements allow conclusions about the course of phase transformations as well as about the properties of the used original cellulose.

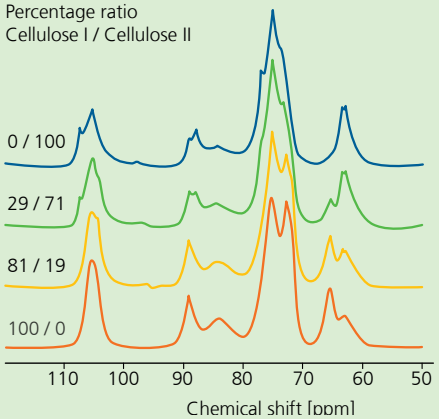

Fig. 1 ^{13}C-CP/MAS-NMR spectra of a transformation series of cellulose I in cellulose II.

With the same technique cellulosic components can also be identified and quantified in other blends, e.g. in composite materials with thermoplastic polymers.

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