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CELLULOSE-BASED MATERIALS –
FROM SCIENCE TO TECHNOLOGY

Simon Schölch^[1], Jan-Lukas Schäfer^[2], Thomas Brandstetter^[3], Markus Biesalski^[4],
Jürgen Rühle^[5]

Novel crosslinker systems for light and heat induced wet-strengthening application

[1] Simon Schölch, Chemistry and Physics of Interfaces, University of Freiburg; Georges-Köhler-Allee 103, 79108 Freiburg, Deutschland, simon.schoelch@imtek.de

[2] Jan-Lukas Schäfer, Ernst-Berl-Institute for Technical and Macromolecular Chemistry of the Technical University of Darmstadt, Alarich-Weiss-Str. 8, 64287 Darmstadt, Deutschland, j.schaefer@cellulose.tu-darmstadt.de

[3] Dr. Thomas Brandstetter, Chemistry and Physics of Interfaces, University of Freiburg; Georges-Köhler-Allee 103, 79108 Freiburg, Deutschland, thomas.brandstetter@imtek.uni-freiburg.de

[4] Prof. Dr. Markus Biesalski, Ernst-Berl-Institute for Technical and Macromolecular Chemistry of the Technical University of Darmstadt, Alarich-Weiss-Str. 8, 64287 Darmstadt, Deutschland, biesalski@tu-darmstadt.de

[5] Prof. Dr. Jürgen Rühle, Chemistry and Physics of Interfaces, University of Freiburg; Georges-Köhler-Allee 103, 79108 Freiburg, Deutschland, ruehe@imtek.uni-freiburg.de

Abstract

In our work we try to extend the spectrum of crosslinker-monomers which can be used for the modification of paper and which can be activated thermally or at longer wavelength (365 nm) compared to the so far used benzophenone-crosslinkers¹. With the newly synthesized copolymers we focus on the improvement of wet-strengthening properties of paper substrates. New functional comonomers have been applied successfully for the modification of paper. A diazomalonic-ester monomer² was synthesized and copolymerized with *N,N*-Dimethylacrylamide. Afterwards this copolymer was covalently attached to the paper, induced either by UV-light or thermally. Analogous experiments carried out with a monomer which contains an anthraquinone unit (AOAQ) as crosslinker demonstrate its viability for crosslinking with UV-light at 365 nm. In further experiments the wetting behavior of the fibers was investigated in detail. It could be found out that the fiber swelling upon contact with the polymer solution has a high impact on the wetting behavior.



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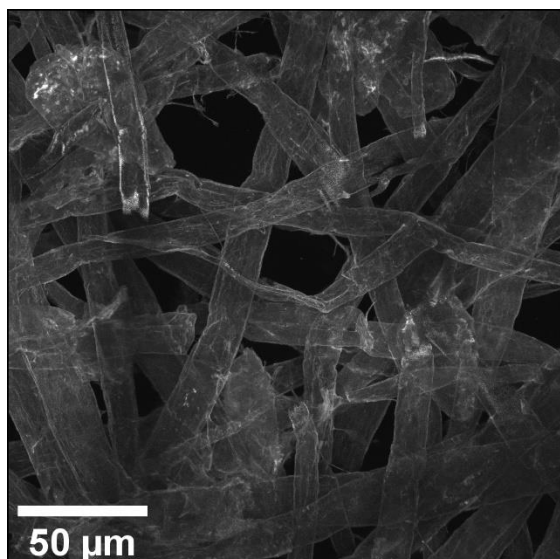


Figure 1. Wetting of Eucalyptus fibers with a PDMAA-Copolymer applied from a aqueous solution.

KEYWORDS:

paper
wet strengthening
crosslinking
UV-light
copolymer
fluorescence
fiber wetting
fiber swelling



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Biography

- 10/2010 – 08/2013 B.Sc (Chemistry)
Albert-Ludwigs-Universität Freiburg
Supervisor of the bachelor thesis: Prof. Dr. Ingo Krossing
Topic: Coordination chemistry of pyridyl- and pyrazylsubstituted diazoles
- 10/2013 – 02/2017 M.Sc (Chemistry)
Albert-Ludwigs-Universität Freiburg
Supervisor of the master thesis: Prof. Dr. Jürgen Rühle
Topic: Investigations on grafting-through polymerization on various substrates
- 03/2017 – 09/2017 Internship in Industry
ActegaDS Bremen
- 02/2018 – current PhD thesis in progress
Chemistry and Physics of Interfaces, Albert-Ludwigs-Universität Freiburg
Supervisor: Prof. Dr. Jürgen Rühle
Topic: Development of new crosslinkers for wet-strengthening of paper substrates and investigation of the wetting of cellulose fibers with polymer additives.

