

Functionalization of PLA Fibers and Textiles

Poly lactide fibers (PLA) exhibit excellent mechanical properties such as high tensile strength, making them potentially an alternative to petroleum-based synthetic fibers. However, for a variety of classical applications, textile fibers need to be treated during the manufacturing process or subsequently by appropriate surface modification in order to give the material functional properties such as flame or UV protection, antimicrobial behavior or even electrical properties. Thus, the aim of the R&D project was to work out the basic parameters for the targeted functionalization of PLA fibers. In this context, antibacterial properties could be imparted to the textiles by sol-gel finishing with silver or zinc oxide. Finishing with vinylphosphonic acid led to a significant improvement in flame-retardant properties. Subsequent finishing with the conductive polymer PEDOT:PTSA significantly reduced electrical resistance, so that such textiles can be used as flexible heating elements, for example in car seat heaters or as electric blankets. The hydrolysis resistance of PLA could be improved by adding suitable additives to the spinning mass. In addition, the dyeing of PLA was successful both from the spinning mass and with disperse dyes. Very good levelness and high color depths were achieved. Overall, the R&D project presented here has significantly increased the level of knowledge on the modification of PLA fiber. Thus, the R&D results show the principle possibility of modifying PLA fibers according to textile-specific methods in or on the fiber in order to give the material new or improved properties. This opens up the possibility for SMEs in the industry to place new products based on renewable raw materials on the market in the medium term.

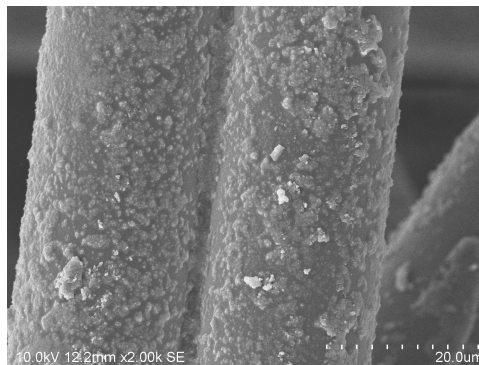
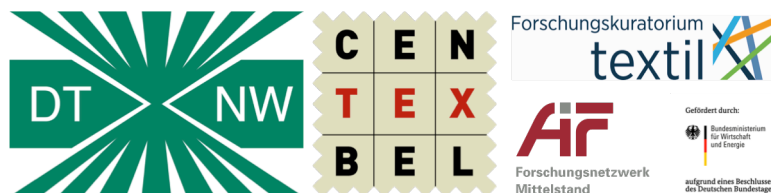


Figure 1: Antibacterial finishing of PLA fibers with zinc oxide particles.

Project Information:

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