

Dyeing of aramids and other high-performance fibers from ionic liquids

Due to their outstanding properties such as high strength, non-flammability and chemical resistance, aramid fibers are used, for example, in the field of protective workwear, ballistic vests or fiber composites. For a variety of applications, dyeing of the fiber material is desirable. However, the dyeing of aramids in its previous implementation has proven to be a multi-step, time-consuming and cost-intensive process, which is also associated with high chemical requirements. Therefore, alternative dyeing processes for high performance fibers are highly desired by the textile processing industry. Ionic liquids (IL) are salts that are liquid below 100 °C and have amazing dissolving properties for different substances. DTNW had already shown in advance that IL are basically suitable as textile dyeing media for e.g. polyester. Accordingly, the aim of the R&D project was to transfer the process engineering principles to the dyeing of aramid and other high-performance fibers. It was shown that m-aramid as well as polybenzimidazole, polycarbonate, Torlon, Pertinax and glass fibers can be successfully dyed from IL. In addition, concrete statements on the transfer to textile practice could be derived for the economically important m-aramid fibers. This opens up the possibility for SMEs in the field of fiber finishing to create high-quality dyed products using new process technology. The introduction of IL into both textile research and textile process engineering also means a link to a highly topical field of research that encompasses many areas of technology and industry and can thus also generate cross-industry synergy effects. For example, SMEs from the field of IL manufacturing as well as textile auxiliaries companies can also benefit from the R&D results.

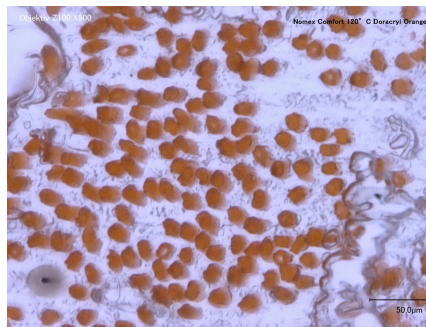


Figure 1: Cross-section of m-aramid fibers after dyeing from ionic liquids.

Project Information:

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