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Natural-based dyes for cellulose filament production and its performance Antje Ota¹, Marc P. Vocht^{1,2}, Frank Hermanutz¹

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The processing of cellulose using imidazolium based ionic liquids as solvents is a promising and environmentally friendly fiber spinning technology of high industrial interest.^[1] The process developed by DITF is called HighPerCell[®] (*HighPerformanceCellulose Fibers*) technology. It allows the production of endless cellulose filaments in closed loop process with recovery rate of the solvent higher 99.5%. In addition, various pulp qualities with different purity and cellulose content from different cellulose sources such as annual plant, waste streams aa well as wood sources can be successfully transferred in filaments.^[2,3] Filament properties can be tuned in terms of fineness, filament count and mechanical properties easily. These filaments can be processed easily along textile value chain: from spinning dope into filament and from filament directly into fabrics (e.g. knitted or woven, texturized or flat, twisted or un-twisted). The materials have shiny and smooth surface.

In this work the dyeability of HighPerCell[®] knitted fabrics was tested with the natural-based EarthColors[®]. In order to evaluate the quality of these sulphur dyes, washing, rubbing and light fastness properties of the dyed samples were determined. In addition, tests were carried out to determine the washing resistance and biodegradability of the dyed HighPerCell[®] material.

References:

- [1] F. Hermanutz, M. P. Vocht, M. R. Buchmeiser, in *Commercial Applications of Ionic Liquids* (Ed.: M. B. Shiflett), Springer International Publishing, Cham, **2020**, pp. 227-259.
- [2] A. Ota, R. Beyer, U. Hageroth, A. Müller, P. Tomasic, F. Hermanutz, Michael R. Buchmeiser, *Polym. Adv. Techn.* **2021**, 335-342.
- [3] M. P. Vocht, R. Beyer, P. Tomasic, A. Müller, A. Ota, F. Hermanutz, M. R. Buchmeiser, *Cellulose* **2021**, *28*, 3055–3067.

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