

Abstract:**Use of Nanostructured Materials in Fiber Development**

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Empa's laboratory for Advanced Fibers develops synthetic fibers with distinct functionalities in new combinations. Our pilot melt spinning plant enables us to produce mono- and bicomponent fibers with diverse fiber cross-sections. We use nano-composites to enhance or add new properties to synthetic fibers. The materials of interest include functional nanoparticles, carbon nanotubes, natural nanofibers, and a variety of polymers. Distinct features can be imparted to these fibers in taking advantage of functional properties of the sheath component and mechanical properties of the core component. Ongoing projects include photocatalytic fibers, controlled-release fibers and nanofibril reinforced fibers.

Novel methods to modify synthetic fibers enable us to develop complex fiber surfaces. Techniques like vacuum plasma treatment or continuous dip coating are applied to create micro- and nanosurfaces with given properties such as water repellency, abrasion resistance, flame retardance, biocompatibility or conductivity. Plasma technology offers a convenient way to tailor surface properties due to the possibility to design functionally gradient coatings by ablation and/or deposition processes. Dip coating processes have a great potential to enhance fiber properties in a simple, straightforward process utilizing machinery commonly used in textile finishing.

Curriculum**Formation:**

- 1986-1992:
University of Zurich, studies of chemistry with focus on solid state materials, diploma work at the Inorganic Institute, graduation Dipl.Chem.
- 1992-1997:
Doctorate at the Inorganic Institute of the University of Zurich, with focus in the synthesis and characterisation of micron- to nanosized particles.

Experiences:

- 1998-2004: Project leader at EMPA St. Gallen, Reference Lab for chemical analysis (with focus on inorganic mass spectrometry and the development of reference standards)
- Since 2005 : Project leader at EMPA St. Gallen, Laboratory for Advanced Fibers with focus in fiber meltspinning and e-spinning.

