Multi-functional complex liquids for coating semi/porous surfaces

Victoria Dutschk[1], Majid Nasiri Boroumand[1], Francesco de Rosa[2], Jie Zhao[1,3]

[1]EFSM Industrial Research Group, University of Twente, the Netherlands, V.Dutschk@utwente.nl

[2]Politecnico di Torino, Italy

[3]AkzoNobel, The Netherlands

Intensive development of nanotechnology linked with generation of nanostructures and nanomaterials offers great possibilities of creating modern multifunctional materials. Such materials based on semi-porous surfaces, e.g. textile substrates, can have very wide applications due to the new properties and functions rendered to these substrates such as self-cleaning, anti-bacterial, UV protection, flame resistance, super hydrophobicity, electrical conductivity, friction and wear resistance, environmental purification, pH/thermo-responsive hydrophobicity or hydrophilicity[1,2]. The ultimate impact of nanotechnology in the area of textile and other potential application areas will depend on the type and structure of nano-structured functional agents and their coating process[3].

Among established wet-chemical modifications processes, inkjet printing techniques can be used as a novel approach with high efficiency and low cost to deposit functional agents on fabric surfaces. In our studies, a multi-functional formulations, containing various functional agents which have high affinity to natural and/or synthetic smooth (foils) and semi-porous (textile materials) will be prepared. Semi/porous materials such as polymeric fabrics will be multi-functionalized by the multifunctional formulations including nanoparticles (NPs) with specific properties using wet-chemical and inkjet printing process. The discussed nano-structured functional agents include oxide nanoparticles such as TiO_2, ZnO, Ag as well as artificial and natural nano-clays.

The future studies will be dedicated to semiconductor nanomaterials.

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