

Press release

A new approach optimises "lotus effect" of soil-repellent textiles

Improved surface structure increases hydrophobicity and durability

BOENNIGHEIM (im) Soil-repellent textiles that optimally utilise what is known as the "lotus effect" seen in nature have been developed under the auspices of a joint research project of the BMWi [Federal Ministry of Economics and Technology] carried out by the Hohenstein Institute in Boennigheim and ITCF Denkendorf (AiF-No. 15142 N/1). By means of new fibre structuring, the soil-repellent effect has for the first time been realised through fibre immanent surface structuring. Particles that have been incorporated during manufacturing have shown only negligible effects on the behaviour of dyes and the dye absorbency of the polymer.

Up to now, conventional, subsequent finishing was the means used to apply hydrophobic micro- and nano-structures to surfaces. The functional layer produced in this way demonstrated good soil-repellent effects but was nevertheless not always durable under conditions of intensive use.

Now a new approach to the manufacturing of surface structures has significantly reduced this deficit and optimised the soil-repellent effect of surfaces. An additional, nano-structured surface is generated with the help of superparamagnetic nano-particles directly during the melt spinning process of manmade fibres. This so-called ferromagnetic fibre structuring with high energy magnetic field coil takes place directly after the spinneret, when the spin-melt is still in a thermoplastic state, which ultimately allows for subsequent filament stretching as usual.

Yarns and knitted sample swatches were manufactured in lab scale from the mono-filaments for the purpose of characterising the newly developed surface properties. These samples could then be assessed for their hydrophobic and soil-repellent characteristics as well as their durability during use. For an industrial production of these ferromagnetic structured fibres further research together with a fibre manufacturer is necessary to scale up the spinning process.

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This press release and accompanying images can be downloaded from the Internet at any time from <http://www.hohenstein.de/SITES/press.asp>.

Boennigheim, in March 2010



Thanks to new fibre structuring, highly soil-repellent fibres can now also withstand outer influences such as washing and scratching.



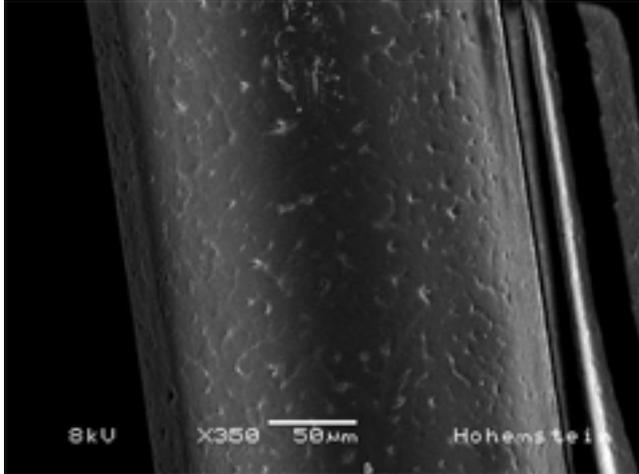
A high-energy magnetic field coil developed at the ITCF for fibre structuring.

Photo: ITCF Denkendorf



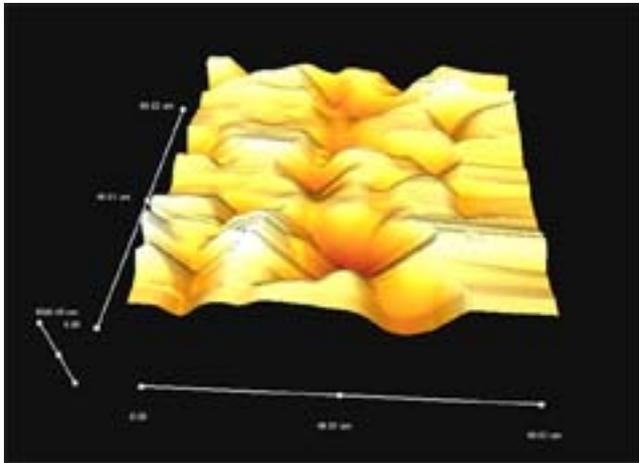
Scientists at the Hohenstein Institute and ITCF Denkendorf realised the soil-repellent effects observed in lotus plants by fibre-immanent structuring of a surface.

Photo: Hohenstein Institute



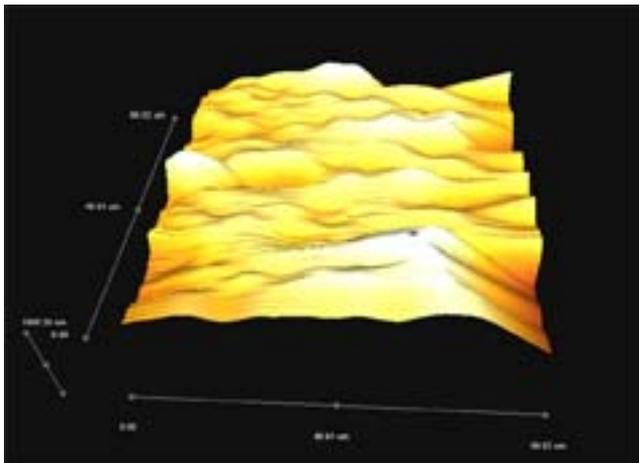
A scanning electron microscope image of a PP (polypropylene) fibre with a surface structured with magnetic particles.

Photo: Hohenstein Institute



Atomic force microscope (AFM) image of the surface structured PP fibres (micromagnetite).

Photo: Hohenstein Institute



Atomic force microscope (AFM) image of the surface structured PP fibres (nanomagnetite).

Photo: Hohenstein Institute