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Plasma functionalization of foils and technical textiles with specific tunable wetting behavior

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Surface layers on foils and textiles with excellent environmental durability are not available for high quality materials. Within a new BMBF-project "Plasmastructured foils and technical textiles with specific tuneable wetting" the task for ROWO Coating is - in coordination with all the project partner, especially with the Fraunhofer IGB and Pink Plasma-finish - to investigate and develop nanoscopic function layers on metallized and unmetallized polymer films and woven or unwoven web materials to get new layers for reaching longstable surfaces.

Very different surface structures are under investigations. Much potential is to be found in the purposeful chemical and physical functionalization of these surfaces. Thin and ultra thin fluorocarbon and HMDSO/SiO_x nanostructured-layers will be developed by plasma polymerization on polymeric surfaces for specific tuneable wetting behavior. By ignition of middle or high frequency pulsed plasma between two electrodes the mixture of different process gases are ionized, fragmented and activated and chemical reactions can takes place in the plasma phase and/ or on the material surface. In this way the surface energy is modified by functional groups at the surface. Special hydrophilic or hydrophobic finishing and also thicker layers can be produced.

But for getting high corrosion and abrasion resistant systems the adhesion of every single layer and the chemical matching by interface layers must be very good. For this aim a lot of investigations and process engineering must be done. The nanostructured layers must then be optimized for different new application performances like antistatic, corrosion and abrasion stability and anti-icing on foils and textiles. On these materials the new nanostructured layers will inhibit contaminations by liquids or ice.

Keywords

plasma
fluorocarbon
HMDSO
corrosion
abrasion