

# STABLE LOW SURFACE ENERGY WITH ADJUSTABLE RELEASE PROPERTIES

Very low surface energy materials present interesting properties, they are used applications such as anti-graffiti, anti-stain, easy-cleaning, biomedical, technical textile etc. However, those materials are usually quite expensive and not easily recycled. Atmospheric pressure plasma enhanced chemical vapor deposition (AP-PECVD) allows to transfer those properties to common polymeric materials. Very low surface energy materials are then obtained for a fraction of the cost and they present better recyclability than traditional low surface energy materials.

In this study, PET, a polyester polymer with a relatively high surface energy (46 mN/m), has been coated with a hydrophobic layer using CPI's atmospheric pressure plasma technology.

After CPI atmospheric pressure plasma treatment, the water contact angle (WCA) measured on the PET film surface is strongly increased. The hydrophilic film surface (WCA < 90°) has turned hydrophobic (WCA > 90°). (Fig.1)

The change in surface energy is related to the composition of the coating deposited on the film. In this case the deposited coating has a chemical structure comparable to low surface energy silicone as evidenced by Figure 2. By adjusting the process parameters it's possible to control the hydrophobicity of the sample as well as the release properties of the film.

Fig. 1 Water droplets deposited on PET film before (left) and after CPI atmospheric plasma coating (right)

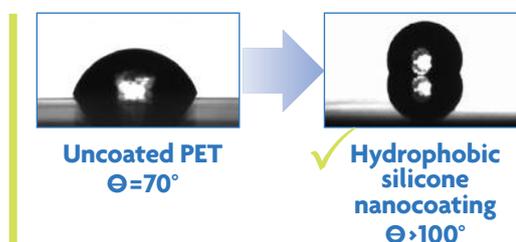
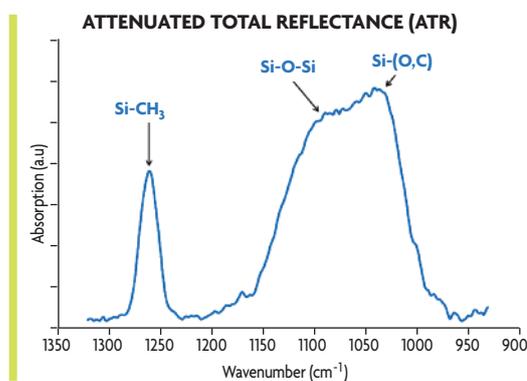


Fig. 2 Chemical characterization of the deposited coating by infra-red spectroscopy (ATR mode)



Tab. 1 Hydrophobic and release coating properties - Peel force of 3M810 tape measured with AR1000 apparatus.

Plasma coating conditions			Water Contact Angle [°]	Peeling Force [N/cm]
Coating Reference	Plasma Dosage	Monomer Flow rate		
Uncoated	N/A	N/A	70.7 +/- 1.1	2.34 +/- 0.13
1	Low	High	102.9 +/- 0.7	1.52 +/- 0.07
2	High	Low	98.8 +/- .3	0.65 +/- 0.15