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**Surface Analysis**

Surface Treatment of Plastic Substrates for Printed Electronics

**Introduction**

Printed electronics is motivated by the numerous “low-end electronics” applications that arise from the possibility to manufacture large quantities of functional electronics at sufficiently low cost. It is based on new classes of materials combined with large-area, high-volume deposition and patterning techniques. Printed electronics allows the use of flexible substrates, mechanical and thermal properties and low cost make polyethyleneterephthalate (PET) one of the prime candidates to be used as substrate for flexible electronics.

But, and specifically when coatings have to be applied, a surface treatment of the blank PET film is necessary to improve the wettability of the substrate. A common method is the treatment of the polymer surface in an oxygen plasma. The plasma contains a variety of particles that are capable of modifying the PET surface.

**Questions**

1. The wettability of a solution on a PET surface can be predicted from the “spreading parameter”. How is the spreading parameter related to surface energy? Explain the concept and describe an experimental method to determine the spreading parameter. To extract surface energies from the measurements, different models are applied. What are the limitations?
2. What sort of chemical modification does a plasma cause on a PET surface. Why does this lead to improved wettability? Suggest a surface analysis technique to monitor the chemical changes after plasma treatment.
3. Plasma treatment of a polymer surface often leads to changes in the surface topography. Describe a method to characterize surface roughness. Does the surface structure have an influence on the wetting behavior?

**Literature**

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