analytikjena

Application Note UV VIS

Application field / industry branch:

- Chemistry / Polymer Industry
- Electronics
- Energy
- Nutrition / Agriculture
- Geology / Mining
- Semiconductor Technology
- Clinical Chemistry / Medicine / Sanitation / Health Care
- Cosmetics
- Material Analysis
- Metallurgy / Electroplating
- Pharmacy
- Refineries / Petrochemistry
- Environment / Water / Waste
- Other

使用积分球测量聚合物箔的透射率

摘要：

有机聚合物以其独有的特性广泛应用于各个领域，如绝缘体、包装材料及建筑行业，这些聚合物材料都是针对性的添加不同的添加物以获得所期望的外观和弹性。

积分球是测量固体、液体、粉末状样品的吸收、透射和漫反射的理想工具，粗糙或带有纹理表面的固体样品易导致光扩散，使用积分球测量时可完全消除光损失，所有漫反射光都可以到达检测器，使用最大狭缝宽度可以降低积分球光能量损失，参比侧测量时使用特质白板，聚合物箔样品放在样品测量位置，用弹簧固定，以实现测量。

本文使用德国耶拿公司 SPECORD 250 PLUS 型紫外分光光度计和积分球附件测量不同类型聚合物箔如 PVC、PMMA 等透射性能，经试验发现不同的聚合物箔在可见光区的透射特性差异很大，PMMA 和 PET 具有相似的透射性能，样品 4 和样品 5 区别于其他种类的一个特征是透射率随着波长的增加而成上升趋势，而 PVC 的透射率随波长的变化波动较大。

使用德国耶拿公司 SPECORD 250 PLUS 型紫外分光光度计加积分球附件可以完美实现上述测量。

Transmission measurement of polymer foils using the integrating sphere

General

Organic polymers are used in the most different fields depending on their properties, such as insulators, packaging material or the construction industry. These plastics are purposefully modified with additives in order to create specific surfaces or to improve the elasticity.

Various polymer foils, amongst them PVC and PMMA, were analyzed for their transmittance properties as presented below. The samples had different surface and elasticity characteristics. The measurement was carried out using the SPECORD® 250 PLUS and the integrating sphere as accessory.

Integrating sphere

The integrating sphere (integrating sphere, Fig. 1) is ideally suited for absorption, transmittance and remission measurements of solid, liquid and as well as of powder samples. With the integrating sphere diffusely remitted radiation of solid samples with rough or grained surfaces reaches the detector evenly without being deflected.

Fig. 1: Integrating sphere

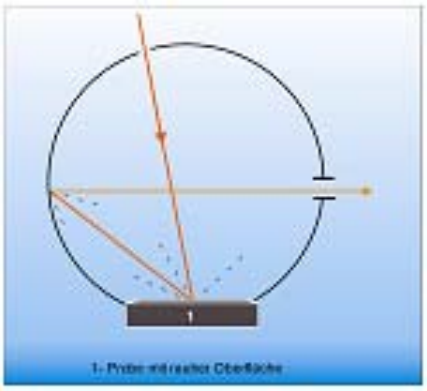


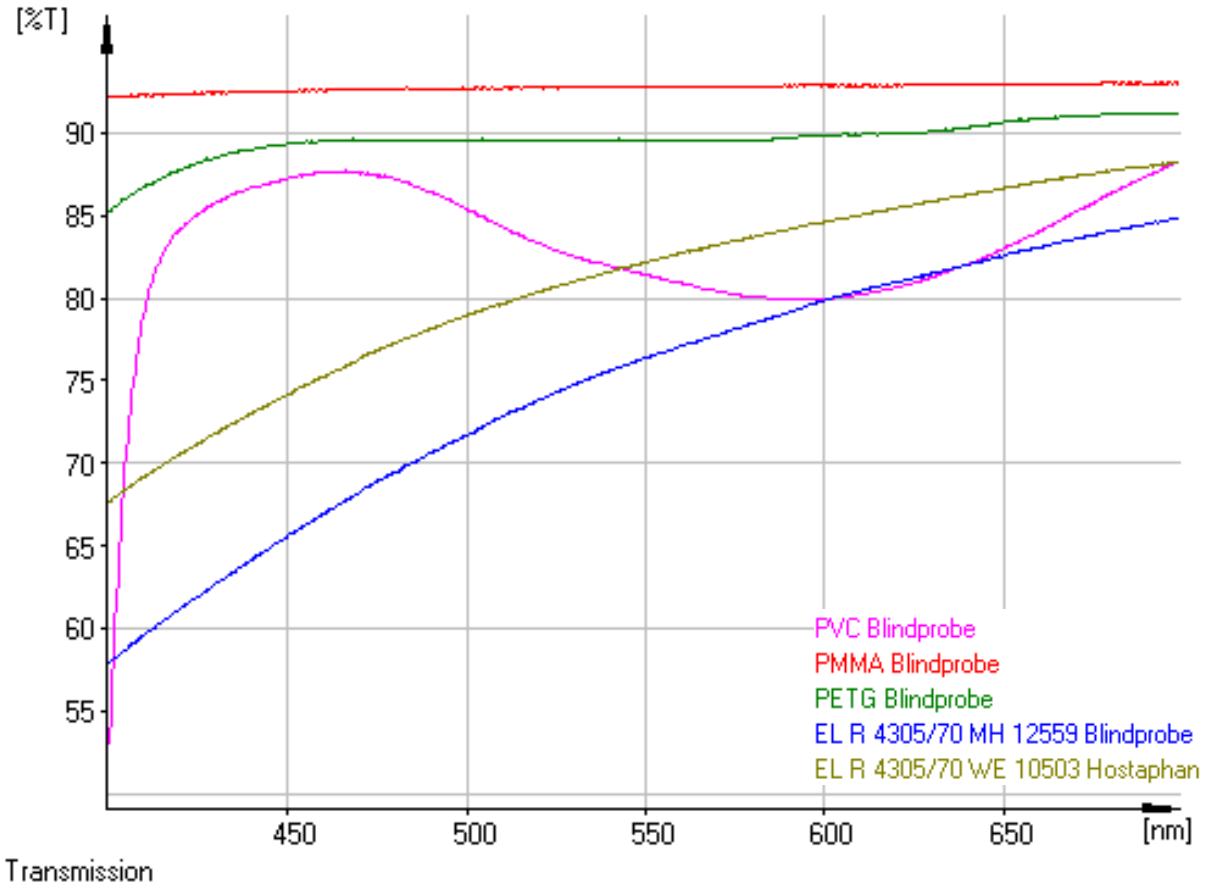
Diagram: Beam path of the integrating sphere

Procedure

The transmittance measurements were carried out using the following parameter configurations:

Title:	Transmittance detection	**Measurement mode:**	Register
Correction:	Reference	**Range:**	400 - 700nm
Display:	Transmittance	**Step width:**	0.2nm
Lamp replacement:	320nm	**Speed:**	5nm/s
Slit:	4nm	**Accessories:**	Integrating sphere

To minimize energy loss through the light path of the sphere, the slit width was chosen as large as possible. The reference measurement was carried out with the spectral insert of the sphere. To measure the samples the polymer foils were moved into the position for solid samples by the pressure spring. Figure 2 shows the transmittance spectra of all foils.



Evaluation

The different polymer foils show strongly different transmittance properties in the visible wavelength range. It is noticeable that the PMMA and PET samples both have a nearly constant transmittance. In samples 4 and 5 the transmittance values rise with increasing wavelength, making them easy to compare. Only the curve of the PVC foil features extreme points and can therefore be well distinguished from all the others.

The SPECORD® 250 PLUS with the integrating sphere enables the best possibility to analyse such samples with a clear differentiation of the recorded remission spectra.

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