

mIRo – mobile Infra-Red optic for Identifying Plastics

High level material plastic recycling demands that plastic materials must be **sorted** according to **various types**. IoSys - Dr. Timur Seidel e.K. has taken part in solving the problem. A **mobile Infra-Red optic** was developed by IoSys for identifying plastics. It will help to make further amounts of waste polymers available for re-use.



With the technique of the so-called near Infrared spectrometry (NIR) it is possible to identify plastics coming from the household-, engineering electronics and automotive application field. It allows direct analysis of non-dark-colored plastic parts (**films, foils, granules, solid, foamed**) and other materials **like carpets and textiles**.

The **basic principle** of the method is the diffuse near infrared reflection spectroscopy whereby characteristic absorption behaviors of different polymer types are used in that spectral region. The polymer sample is radiated with a infrared light and the reflected light of the measuring place is analyzed using a near infrared detector array. To measure transparent materials a white ceramic is used which must be placed behind the sample as a reflection mirror.

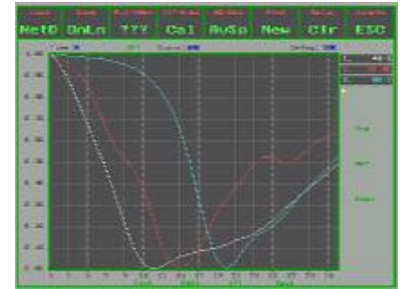


For **plastic identification** the measuring head is simply pressed on to the analysis sample. The measurement begins by pressing the start button on the pistol grip. After one second an integrated color screen displays the recognized polymer. The handheld measuring head is equipped with the NIR-source and a 2 m cable connected to the instrument. The portable device includes the optical NIR-system, the computer, which controls and evaluates the identification process. Parameter settings, as well as a detailed spectra view, can be set by using an integrated touch panel. Additional connections like an external keyboard and a serial interface allow external data transfer. As **optional features** a **Mini-Plotter** printing out the result, an **external relay-interface board** generating output signals for sorting systems and an external **light source module** (e.g. direct measuring of bottles) are available. (dimension in mm: 364 x 195 x 316, weight: 8 kg, power supply: 100-230 Volt~, 50/60 Hz).



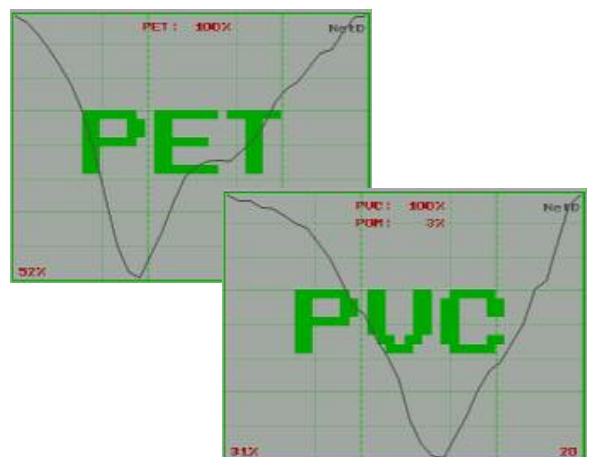
Identification of different plastic types is the result of a trained pattern recognition. After the measurement of the plastic sample the optical information (absorption bands of overtone- and combination vibrations) are processed by a neural network. The result of the calculation is a list of the most probable polymer type identified within a probability of 0 and 100%.

The possibility to display the resulting spectra in detail by connecting an external VGA-display allows to **develop own applications** easily (e.g. identifications of carpets, textiles, food etc.) or to find out particularities (blends).



- ◆ **Recycling of household-, engineering electronics and automotive waste plastics**
- ◆ **Non-destructing measurement**
- ◆ **Less than 1 sec. measuring time**
- ◆ **Independent of surface structure, moisture and contamination**
- ◆ **On site analysis, e.g. in a dismantling area**
- ◆ **Possibility of developing own application methods for rapid grade identification**
- ◆ **Possibility of calibration and editing of up to 8 individual plastics or mixtures by customer**
- ◆ **Direct measurements of bottles in transmission mode (optional extra)**

With the help of the mIRo system it is possible **independently of surface structure, moisture and contaminations** to analyze **within 1 second** as following: **PA6x, PA12, PE, PP, ABS, PS, PPO PCA, PBT, PET, PC, PMMA, POM, PVC**



According to different demands in recycling matters, customers can arrange to have the **system calibrated using their own samples**.

For further information:

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