mIRoPort – portable Infra-Red optic for Identifying Plastics

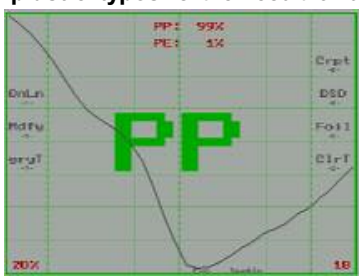
High level material plastic recycling demands that plastic materials must be **sorted** according to **various types**. IoSys - Dr. Timur Seidel e.K. has taken part in solving the problem. Being independent of main power a small **portable and battery-operated Infra-Red optic** was developed by IoSys for identifying plastics wherever you are but almost with the same identification performance like our bigger mobile units (mIRo, sIRo, and mIRoSpark). It will help to make further amounts of waste polymers available for re-use.

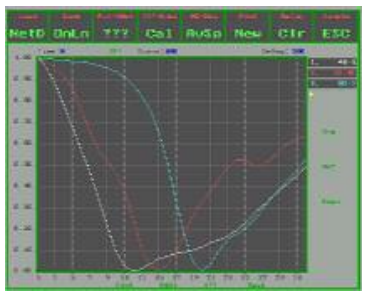
With the technique of the so-called near Infrared spectrometry (NIR) it is possible to identify plastics coming from the household-, engineering electronics and automotive application field. It allows direct analysis of non-dark-colored plastic parts **(films, foils, granules, solid, foamed)** and other 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 rod. Within a second an integrated LCD-touchdisplay shows the recognized polymer. The measuring rod is connected with 80 cm cable to the instrument. The portable device which can be carried with a shoulder strap or on its handle includes the optical NIR-system and the computer, which controls and evaluates the identification process. Parameter settings like model selection can be set by the LCD-touchdisplay. A panel meter shows the actual voltage of the rechargeable battery pack. Additional connections like a serial interface allow external data transfer. As an **optional feature** battery operated **Mini-Plotter** printing out the results is available. (dimension in mm: 250x120x160, weight: 3 kg, power supply: 100-230 Volt~, 50/60 Hz, operation time with integrated batteries: 4-6 h).

Identification of different plastic types is the result of a trained pattern recognition. After the measurement of the plastic sample the optical information 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%.





For detailed spectra viewing, loading, saving, editing spectra etc. an external keyboard and a VGA-Display can be connected. This possibility allows to **develop own applications** easily (e.g. identifications of carpets, textiles, food etc.) or to find out particularities (mixtures).

- **Recycling of household-, engineering electronics and automotive waste plastics**
- **Non-destroying measurement**
- **Less than 1 sec. measuring time**
- **Independent of surface structure, moisture and contamination**
- **On site analysis, e.g. in storehouses, storage areas or on trucks or containers**
- **Possibility of calibration and editing of up to 8 individual plastics or mixtures by customer**
- **Completely portable and battery-operated**

With the help of the mIRoPort system it is possible **independently of surface structure, moisture and contaminations** to analyze 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.**

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