

miRoSpark – Universal solution for Identifying Plastics

High level material plastic recycling demands that plastic materials must be **sorted** according to **various types**. A **combination of mobile Near Infrared optic (miRo) and a Sliding Spark Spectrometer (SSS2)** is now combining the benefits of both technologies in one portable unit.



With this technology combination **practically all common types of plastics, regardless of color, size, structure (films, foils, granules, solid, foamed, carpets and textiles)** can be identified together with their additive elements like fire retardants and heavy metals. For sample preparation to remove dust and dirt or paintings the sample surface can be easily cleaned by scratching with a knife.



The **basic principle of the NIR technology** is the diffuse 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.

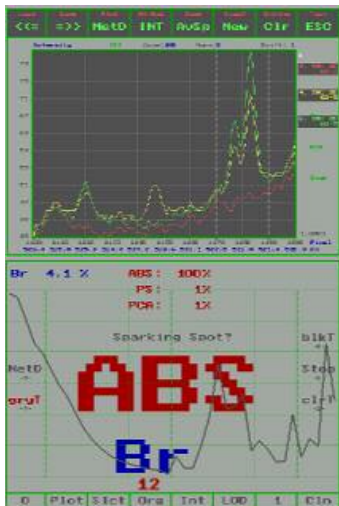
The **basic principle of the Sliding Spark technology** is the thermal vaporization of a small amount of the plastic surface using a train of defined high-current sliding sparks. The material components in the spark plasma are vaporized, atomized and activated to emit radiation.

For **plastic identification** one of the measuring pistols 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 TFT-screen displays the recognized polymer. The measuring pistols are connected with a 2 m cable each to the instrument. The optical signals are transported via fiber cable to the spectrometer systems. 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 serial interface allow 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 200 x 376, weight: 14 KG, power supply: 100-240 Volt~, 50/60 Hz).

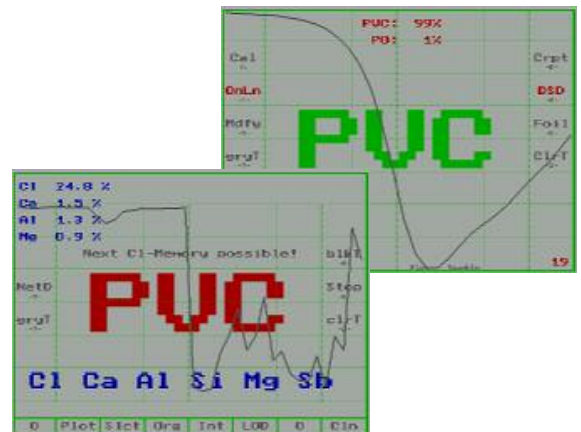


- ◆ **For recycling of all common types of waste plastics**
- ◆ **Non-destructing measurement with NIR part**
- ◆ **Less than 1 sec. measuring time**
- ◆ **Identification of different polymer types**
- ◆ **Detection of halogen-containing fire retardants and heavy metal containing additives**
- ◆ **Possibility 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 miRoSpark it is possible to analyze **within 1 second independently of surface structure, size, coloring and contaminations** the following plastics, their mixtures and additives: **PA6x, PA12, PE, PP, ABS, PS, PPO, PCA, PBT, PET, PC, PMMA, POM, PVC, PPS, Teflon and Silicon rubber**



Additive detection is performed by the characteristic emission for an element of the additive in the optical spectra. The intensities of defined spectral lines are compared with preset threshold values. An element is detected if the pre-set threshold value is exceeded. After calibration with known samples, the system enables semi-quantitative analysis of inorganic contents in the sub-% concentration range.



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 or by the partial least square method. The result of the calculation is a list of the most probable polymer type plus their additives (with the Spark-part).

The setting of different measuring parameters as so as the possibility to display the resulting spectra easily allows to **develop own applications**. According to different demands in recycling matters, customers can arrange to have the **system calibrated using their own samples**.

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