

## miRoSpark – Universal Tool for Polymer Identification

Efficient polymer recycling requires reliable methods for sorting materials by type. The innovative miRoSpark system from IoSys/GUT offers the combined advantages of near infrared and sliding spark spectroscopy in a single portable unit. This powerful tool can identify virtually any plastic as well as additives such as halogens and heavy metals. The system tests solids, films, foils, granules, foams and other polymer formulations. Test results are unaffected by sample color, surface texture, moisture content or contaminants, and no prior sample preparation is required.

### Universal mobile spectrometer system miRoSpark



Using the miRoSpark's sliding spark capability; a small area of the plastic surface is subjected to rapid thermal vaporization using a train of defined high-current sliding sparks. The polymer components in the spark plasma are vaporized, atomized and activated to emit radiation. Using diffuse near infrared (NIR) reflection spectroscopy, the device analyzes the absorption characteristics of different polymers in a given spectral region. In this mode, the sample is irradiated with infrared light, and the light reflected from the sample is analyzed using a near-infrared detector array

Polymer identification is made possible by trained pattern recognition. Optical and electrical data acquired in the test are processed in a neural network or by the partial least square method. Additive detection is achieved by analyzing in the optical spectra the characteristic emissions of additive elements including bromine, chlorine, phosphorus and heavy metals. The intensities of defined spectral lines are compared with preset threshold values to determine the presence of these elements.

Tests are performed by holding the sparking head or the NIR test head against the sample and pressing the start button on the pistol grip. Almost instantly, the results

appear on the integrated color display as percent probabilities of the polymer and additives contained in the sample.

The device includes two optical systems, a spark generator and a computer which controls the analysis functions. Two test heads are connected to the device by 6 foot cables, one head containing the NIR source and the other containing the sparking electrodes and optical detector. Parameter settings and detailed spectral views are selected using an integrated touch screen. Options include an external relay-interface card, a mini-plotter for printing test results, a carpet analysis module, and a transmission measurement module. A keyboard can be connected if desired.

Dimensions: 12.5 x 7.9 x 14.8 in., weight: 28.7 lbs, power supply: 100/110/230 Volt~, 50/60 Hz

- Identifies and analyzes PA6x, PA12, PE, PP, ABS, PS, PPO, PCA, PBT, PET, PC, PMMA, POM, PVC, ETFE
- Identifies and analyzes halogens and heavy metals
- Applications: recycling of all types of waste plastics
- Measurement time: less than 1 sec.; 1-10 milliseconds in automated mode (NIR)
- NIR measurements are non-destructive
- Results are mostly unaffected by texture, color, moisture content or contaminants
- Users can create their own test criteria and test functions
- Portable design facilitates on-site analyses
- Can be calibrated to as many as 8 sample types
- Includes 7 signal outputs to facilitate sorting

