BUCK Scientific

Application Note #IR3004

Rapid Field-Screening of Waste Oil/Solvent Drums with Horizontal ATR / Fast-Screening IR Spectroscopy

Problem

While the growth of technology and industry has given us a high standard of living, it has also given us a greater amount of waste products to deal with. A significant portion of the waste is either buried underground or stored in abandoned warehouses. Some of this waste material may be harmless and innocuous, and some may be quite hazardous; but *all* of it must be tested by some procedure to properly classify it.

The accepted laboratory protocols from the U.S. EPA specify *gas chromatography* as a primary analytical method for trace component determination, but this is both an expensive and time consuming technique.

Principle

A homogeneous sample of container waste can be analyzed on an IR reflectance accessory with an inert horizontal plate. The sample is scanned with an IR spectrometer, where certain organic molecules absorb specific wavelengths of IR light. This creates an IR Spectrum which is selective enough to make a "fingerprint" for the sample. This sample spectrum can then be compared to a "spectral library" of known pollutant materials and searched for a list of matches.

Practice

A sturdy, field-functionable IR system consisting of the Buck Scientific M500 IR Spectrometer, GRAMS®/IR Software, and the PLC-11M Prism Cell can be used for rapid screening of these types of samples.

The inert zinc selenide crystal of the ATR resists all solutions and can be safely and easily cleaned between samples. The M500 monochromator based optical system is impervious to vibrations, dust, and moisture, unlike other systems. The GRAMS/IR software provides complete control of the instrument and data.

A "scoop" of sample is placed on the Prism Cell, where a scan is taken with the M500. The final spectrum is then searched for matich spectra using the software. A printout of the results can be done in under 5 minutes. This type of screening increases the efficiency of the lab analysis and the processing of the waste.

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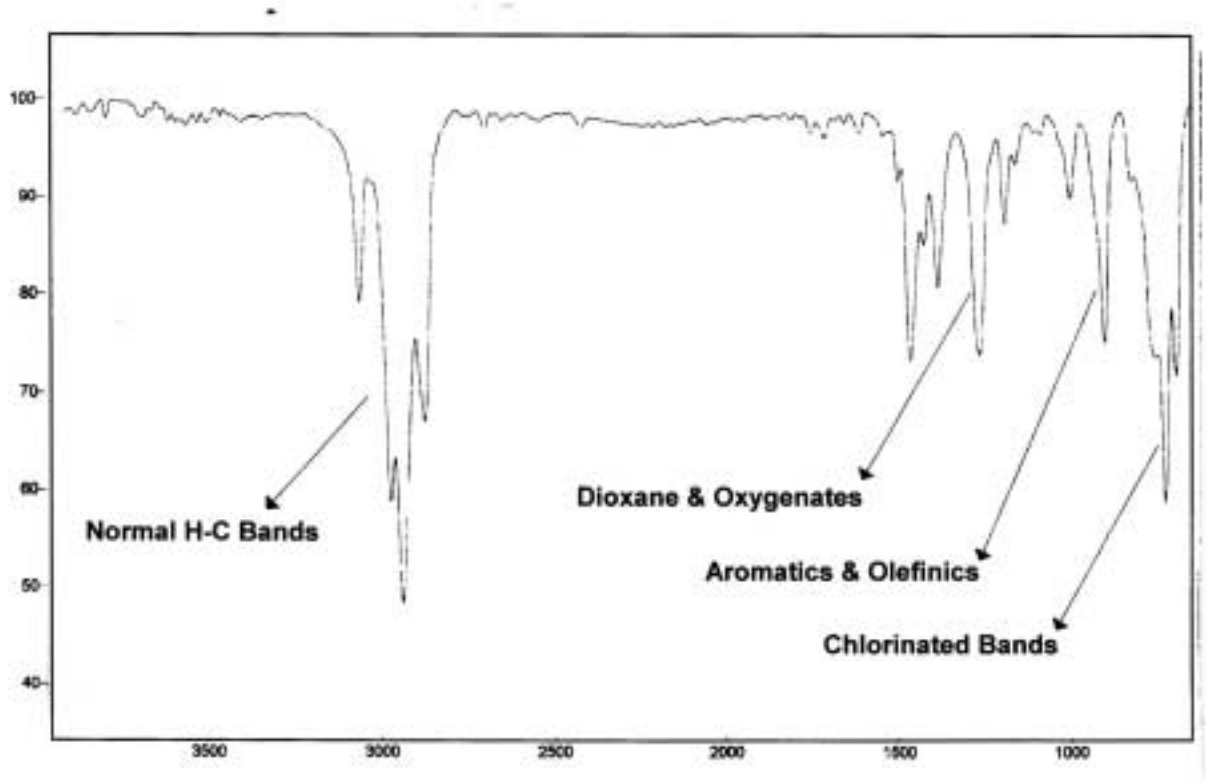
SIC: 138, 178, 1794, 286, 353, 3713, 3712, 374, 494, 495, 9511

Evaluation Samples: Waste Oil



A sample of a highly contaminated waste lube oil showing halogenated solvents (chloroform, chloroethyleness), aromatics (benzene, toulene, xylene), dioxanes, and ethers. Data comes from a three-minute scan.

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