

#### **Product Information**

FTIR: JE-PI-IR0908-0003

#### Coupling FT/IR-4000/6000 with IRT-1000

Coupling FT/IR4000-6000 with Irtron  $\mu$  (IRT-1000) in sample compartment microscope may be tasking if the proper detector is not used. In fact, the microscope is behaving like every other IR accessory using the same detector mounted inside main unit, DLATGS as standard, MCT as an option, if this is available as well.

In the specification sheet of Irtron  $\mu$ , we clearly indicate the smaller dimensions of a measurable sample according to the detector which is used in conjunction with the microscope.

We want here to provide a practical comparison example by testing a unit provided with both detectors in order to show practical instrument performances in the two cases in order for you to have a clear picture of what is required by your customer.

All the following data are kindly provided by Stephen Cave of JASCO UK, which we kindly thank for his contribution.

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#### **Use of MCT Detection with the IRT-1000**









# **JASCO** Detector Sensitivity Guide





MCT detector is typically more than an order of magnitude more sensitive than a conventional DLATGS detector





Comparison of background energy profiles for MCT and DLATGS detectors using identical conditions – reflectance mode, 200 x 200µm aperture, 48 scans at 4cm<sup>-1</sup> resolution.

DLATGS energy throughput is around 0.3% at 2000cm<sup>-1</sup>



#### 100%T Comparison





#### 100%T Comparison





#### **A Practical Example**





Ink spot on a mirror measured in reflectance mode using both MCT and DLATGS, under identical conditions –

200 x 200 µm aperture, 48 scans at 4cm<sup>-1</sup> resolution



# **IRT-1000 and ATR Objective**

- The situation is more acute when using the IRT-1000 with the optional ATR
- In the following examples comparisons were made using the ATR-1000-VG ATR objective, Ge prism







Above shows the background energy profiles for MCT and DLATGS detectors overlaid using identical conditions – ATR-1000-VG ATR objective, Ge prism, maximum aperture, 256 scans at 8cm<sup>-1</sup> resolution.

The profiles look quite similar but they are overlaid using normalise to present them on a similar scale MCT and DLATGS





DLATGS



Here you can see the same background spectra however, if you compare the energy throughput MCT (Left) and DLATGS (Right) you can see that the sensitivity using the MCT (120 units) is much higher than the DLATGS (1 unit). You can also see where the cut off wavelengths are at around 5475 cm-1 and 680 cm-1





Here we have the same scans overlaid on the same scale to emphasise the difference in the sensitivity of the detectors



#### 100%T Comparison



Here we have the 100%T scans (256) overlaid on the same scale to emphasise the difference in the noise in the transmission scan through the Ge Micro-ATR note no correction has been made for  $CO_2$ 

# **Coke can inner using ATR and IRT-1000**



Here we have the spectra from the inner surface of a cola can collected using the Ge ATR on the IRT-1000 and FT/IR-4200 with MCT and DLATGS detector



#### Surface of Aspirin tablet using Micro-ATR and IRT-1000





#### Red stain (ink spot) on surface of Aspirin tablet



Here we have the offset spectra from the same sampling position - a red ink spot stain on the surface of an aspirin tablet collected using the Ge Micro-ATR on the IRT-1000 and FT/IR-4200 with MCT and DLATGS detector



# **Typical data collection times**

- MCT 256 scans 2 minutes 16 seconds at 8 cm<sup>-1</sup> resolution
- TGS 256 scans 3 minutes 58 seconds at 8 cm<sup>-1</sup> resolution
- MCT 512 scans 4 minutes 36 seconds at 8 cm<sup>-1</sup> resolution
- TGS 512 scans 7 minutes 57 seconds at 8 cm<sup>-1</sup> resolution
- ATR pressure set at 0.7
- Zero Filling On, Apodization Cosine, Gain Auto (64), Aperture Auto (7.1 mm) Scanning Speed Auto (2 mm/sec) Filter Auto (30000 Hz)





- 100%T results show that the MCT detector is more than 30 times more sensitive than the DLATGS under identical conditions.
- In practical terms, this means that using an MCT will give better quality scans in a shorter period of time, and would allow the use of much smaller apertures on the IRT-1000 compared to the DLATGS.