

# TERRA

## Field Portable XRD/XRF for Material Analysis



Self-Contained X-Ray  
Diffraction and X-Ray Fluorescence  
Instrument

## Patented Technology From NASA and Olympus



Initially conceived to perform chemical and mineralogical testing for NASA's Mars Science Laboratory (MSL) mission, Olympus' Terra™ is a rugged, fully portable field instrument which harnesses advanced dual XRD/XRF technology and renders it for earth-bound applications. Combining both Olympus and NASA innovation, Terra brings to life a new way of performing X-ray diffraction and X-ray fluorescence measurements.

Using a specifically developed direct excitation charge coupled device (CCD) "camera", Terra is able to collect X-ray photon data for both X-ray diffraction and X-ray fluorescence simultaneously. This is the result of the integrated camera's ability to detect both photon position and photon energy at the same time. With energy resolution of ~200 eV (5.9 keV), Terra makes XRF analysis as simple as viewing the software spectrum display.

## Easy Sample Preparation

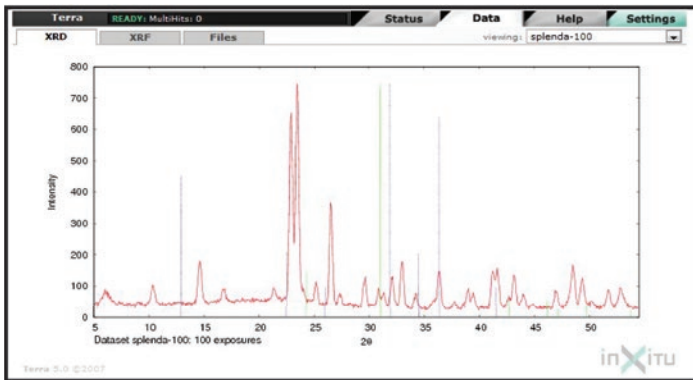


TERRA™ radically simplifies sample collection for your X-ray diffraction experiments. Typically, a sample must be finely ground and pressed into a pellet in order to ensure a sufficiently random orientation of the crystals.

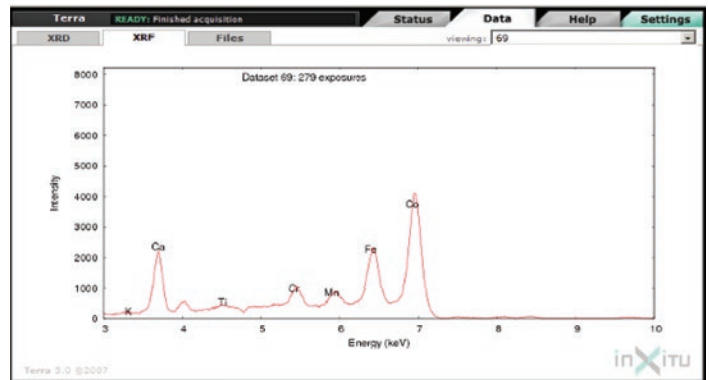
TERRA's patented sample vibration chamber eliminates this issue. Requiring a mere 15 mg sample, the vibration chamber's convection process presents the instrument optics with multifarious orientations of the crystalline structure. This results in a superb X-ray diffraction pattern, virtually free of the problematic preferred-orientation effects encountered when using classic preparation methods.

Due to its unique powder-handling system, nonmechanical goniometers, and lack of complicated moving parts, TERRA™ is extremely well suited for those applications where field portability and/or ease of use is at issue.

## X-ray Diffraction Data



## X-ray Fluorescence Data



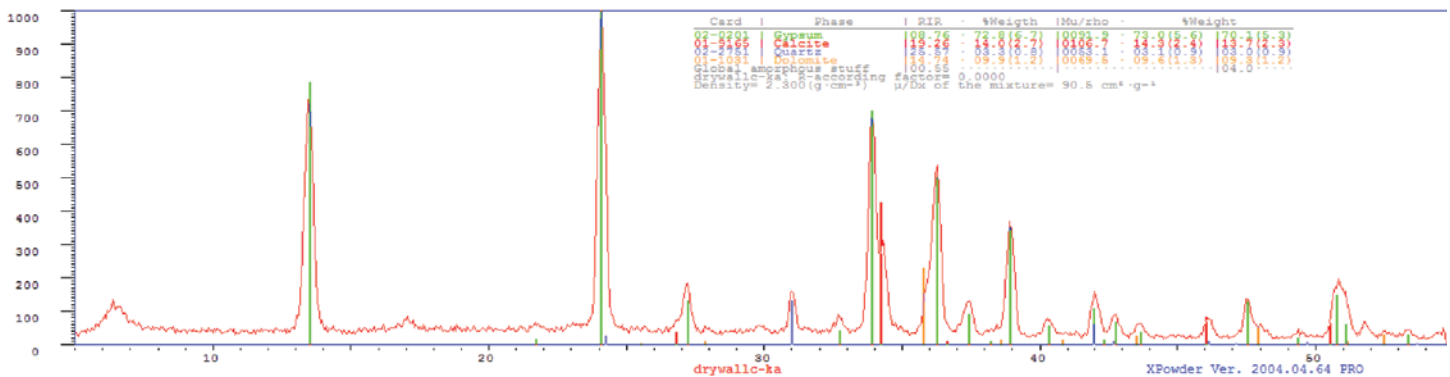
Search/Match & XRD Quantitative Analysis Software Included

## XPowder Software

Terra™ is shipped with the necessary software (XPowder) for processing the resulting X-ray diffraction data. This includes the AMSCD mineral database. Should the user wish, XPowder provides the ability to use the ICDD Powder Diffraction Files (PDF).

For quantitative analysis, XPowder comes complete with reference intensity ratio (RIR) quantitative analysis methods as well as full-pattern analysis tools.

Furthermore, Terra provides XRD pattern data in a variety of file formats, making XRD pattern interpretation in third-party programs easily accessible.



## Connectivity

Terra™ operates off software embedded in the unit itself. The user accesses the operating system through a wireless connection (802.11 b/g). This remote operation method allows for a wide degree of flexibility in controlling the instrument and subsequent data handling.

# Specifications

XRD resolution	0.25° 2θ FWHM
XRD range	5-55° 2θ
Detector type	1024 × 256 pixels - 2D Peltier-cooled CCD
XRF energy resolution	250 eV at 5.9 keV
XRF energy range	3 to 25 keV
Sample grain size	<150 μm crushed minerals - (100 mesh screen, 150 μm)
Sample quantity	~15 mg
X-ray target material	Cu or Co (Cu standard)
X-ray tube voltage	30 kV
X-ray tube power	10 W
Data Storage	40 GB - Ruggedized internal hard drive
Wireless Connectivity	802.11b/g for remote control from web browser
Operating Temperature	-10 °C to 35 °C
Weight	14.5 kg with four batteries
Size	48.5 cm × 39.2 cm × 19.2 cm (19.1 in. × 15.4 in. × 7.6 in.)
Enclosure	IP67, MIL C-4150J rugged case
Field autonomy	~4 hours (hot swap batteries)

[www.olympus-ims.com](http://www.olympus-ims.com)

**OLYMPUS**<sup>®</sup>

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