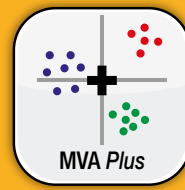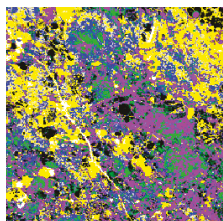# HORIBA
Scientific

MVAPlus: the Multivariate Analysis App for all Raman Maps

Multivariate analysis at your fingertips

MVA *Plus*

Raman spectroscopy is an easy and quick way to identify and quantify chemical compounds in an unknown sample. Nevertheless, most "real-life" samples like cells, proteins, medical drugs, forensics or geological cores are very complex. Multivariate analysis techniques are the only efficient mathematic way to accurately identify and quantify Raman spectroscopy data. *MVAPlus* is a perfect tool for Raman microscopy, allowing chemical information to be combined with optical data to provide a complete map of the sample.

With the MVAPlus application, any multi-compound Raman map can be quickly and easily analyzed.

## A wide variety of algorithms for a simplified analysis

With **MVAPlus**, complex Raman chemical images can be processed and characterized rapidly and easily. A totally integrated module within the LabSpec6 software suite, **MVAPlus** has been tested and validated on a variety of datasets from small to large and with various Signal-to-Noise ratios.

Thus the *MVAPlus* app:

- Combines **all the most common unsupervised multivariate algorithms** (PCA, MCR, HCA and K-means) for loading generation with **Smart Adaptative Classical Least Squares (CLS) Fitting** for image generation.
- **Automatically determines the reference spectra** of your spectral dataset faster than ever.
- Compares, in the blink of an eye different multivariate algorithms.
- Provides a user-workflow-based interface for Raman image generation.

MVA for large and 3D samples

MVAPlus enables multivariate analysis on huge datasets **up to 4,000,000 points including 3D maps.**
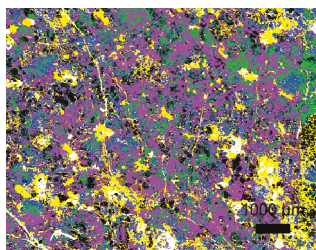
Meteorite picture (726, 656 points)
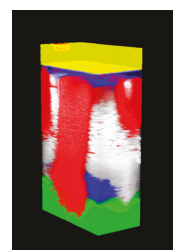
3D multilayer polymer (230x120x400 µm 1,490,400 points)

Data Processing has never been so easy

An algorithm comparator tool is included in MVAPlus. This tool compares loadings obtained with different algorithms, allowing the most appropriate method for the analyzed dataset to be found.
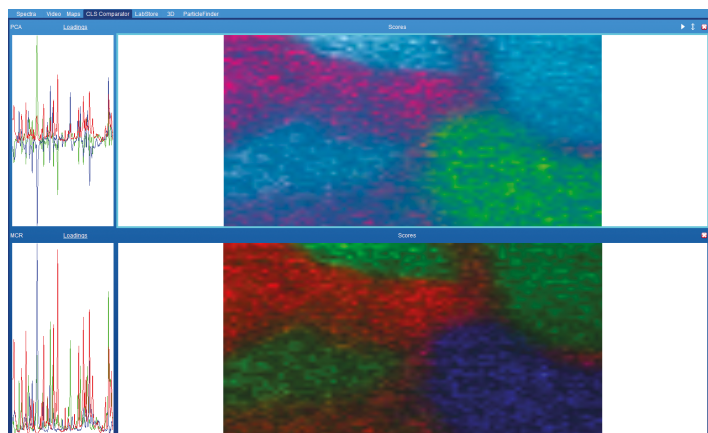
Comparison between PCA and MCR applied on a pharmaceutical tablet mapping

Simple user interface

The *MVAPlus* user interface follows the natural MVA workflow, i.e. method selection, loading calculation, and finally, image generation. It automatically adjusts the image processing according to the selected method. Loadings identification is simplified with auto-identification by KnowItAll® software. Moreover, it allows the generation of additional data such as error maps, residual spectra, scatter graphs, etc.
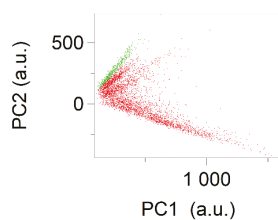
Main Applications

Pharmaceutical
- API identification and quantification
- Contaminant identification and quantification
- Counterfeit detection and origin

Lifescience technology and clinics
- Cell line identification (medical diagnostic and research)
- Proteins distribution in specific cell/tissue
- Bacteria/virus protein identification and quantification

Geology/environment
- Mineral sample composition and identification
- Contaminants in soil/water identification or quantification

Forensic/food safety
- Identification of food product origin (oil…)
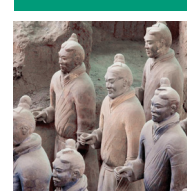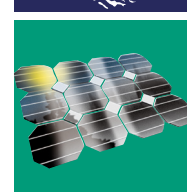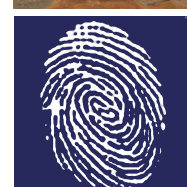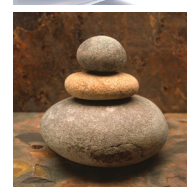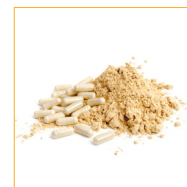- Accurate analysis of trace evidence

Polymers
- Multilayer film analysis
- Blending study

Energy
- Cathode molecular conversion
- Solar cell defect analysis

Archaeometry
- Fossil and artifact composition
- Artefacts manufacturing investigations

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