OPTICAL ANALYSIS SYSTEM

Technological advantages

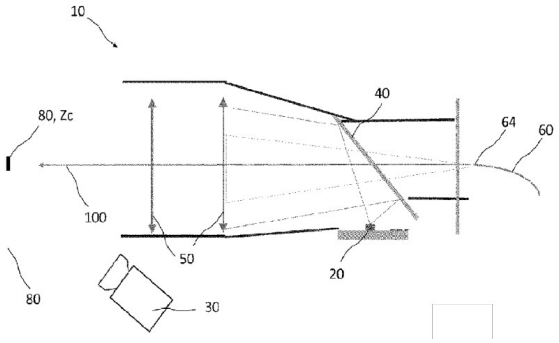
- Dual-Mode spectroscopy: reflectance and fluorescence measurements using a single device.
- Enhanced pointing precision: optical fiber that guides a pointing beam through the analysis field of view.
- Contextual data mapping: camera allows for the overlay of spectral data onto real-time images.
- Ambient light resilience: optimized optical design enables accurate measurements in normal lighting.
- Automated Classification: use of machine learning.

Invention synthesis

This invention is an advanced optical analysis system designed for the non-destructive detection of surface materials and contaminants. It works by projecting a light flux (UV, visible, or IR) onto a target area through a dichroic mirror and a focusing lens. The resulting signal (using reflection or fluorescence) is collected by an optical fiber and sent to a spectrometer to create a unique spectral signature. The system integrates a camera and a coaxial light pointer, allowing to see the exact measurement spot within a larger visual context. By solving traditional alignment and calibration challenges, this device enables the creation of spatial similarity maps, making it easy to identify specific areas of interest, such as degradation in artwork or microscopic impurities in manufacturing.

Potential applications

- Cultural heritage: analyzing pigments and detecting hidden layers on artworks and sculptures.
- Aerospace industry: monitoring contamination on satellites and components in cleanrooms.
- Medical diagnostics: surgical assistance for real-time tumor tissue identification using fluorescence imaging.
- Semiconductor manufacturing: quality control and impurity detection in electronic environments.



Schematic of the optical system
(10) Optical analysis system
(20) Light source
(30) Camera
(40) Dichroic filter
(50) Lens
(60) Optical fiber
(80) Test area

Commercial benefits

- Cost efficiency: a single tool replaces multiple specialized optical instruments.
- Operational speed: fast setup and calibration times with laser pointing features.
- Improved accuracy: minimizes human error related to measurement positioning and parallax issues.
- Automated insights: use of AI for material and contaminant classification.

Patented invention - under license.

For more information :

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