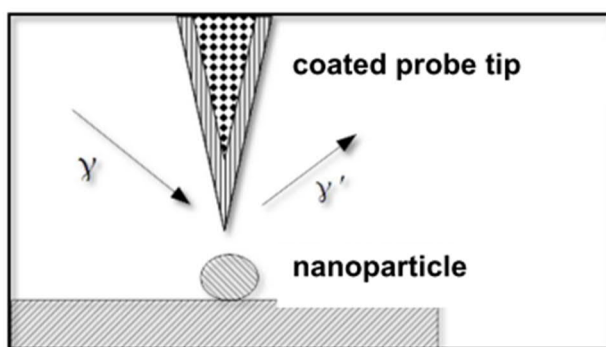


## Optical method for the characterization of metallic nanoparticles

Plasmon, Raman signal, resonator structure

### DESCRIPTION OF TECHNOLOGY

The examination of nanoparticles in samples, in particular individual nanoparticles, for identifying materials (e.g. different semiconductors or pigments) can be routinely carried out via Raman-spectroscopic methods and partially in combination with scanning probe methods such as tip-enhanced Raman spectroscopy. However, these methods are not suitable for characterizing all classes of materials. In particular, metals do not exhibit any Raman signals and therefore cannot be detected directly via this method. This means that there is no routinely, quickly applicable method to identify individual metal particles other than by electronmicroscopic or electronspectroscopic methods working with devices in ultrahigh vacuum environments, i.e. analytic techniques which are comparatively expensive.



We offer a solution for the examination of metallic nanoparticles in a sample exploits the plasmonic properties of metals. A metal tip with a Raman-active coating is used as a sensor. It approaches the particle to be examined such that tip and particle form a resonator structure in the case of a metallic nanoparticle. This resonator structure causes the Raman signal originating from the sensor coating to be amplified and thus enables one to identify the particle to be metallic under normal conditions.

### APPLICATION FIELDS

The detection of metallic nanoparticles in, for example, the analysis of water or food samples, is a possible area of application.

### AT A GLANCE ...

#### Application fields

- Raman spectroscopy
- chemical analysis

#### Business

- Analysis of material and surface for semiconductor industry
- Laboratory analytics
- Food analytics
- Water analytics

#### USP

- Fast and simple characterization of metallic nanoparticles
- Compact device
- No ultra-high vacuum required

#### Development status

- Prototype

#### Patent status

European Patent EP 2913662 B1 is granted.

## ADVANTAGES OVER THE PRIOR ART

- Fast and simple characterization of metallic nanoparticles
- Compact device
- No ultra-high vacuum required

## STATE OF THE PRODUCT DEVELOPMENT

Prototyp is developed

## MARKET POTENTIAL

Raman spectroscopy is a probe-free technology that allows several parameters to be measured simultaneously. It has many applications in analytics and is regarded as a breakthrough technology with great potential. For the first time, complex, sensitive and fast analyses are possible at acceptable costs and with relatively small instruments.

## COOPERATION OPPORTUNITIES

On behalf of its shareholder, the Justus Liebig University of Giessen, TransMIT GmbH is looking for cooperation partners or licensees for the production / distribution / further development in Germany, Europe, the USA and Asia.

## A TECHNOLOGY OF



REFERENCE No.: **TM 776**

### Contact

TransMIT Gesellschaft  
für Technologietransfer mbH  
Kerkrader Straße 3  
35394 Giessen  
GERMANY  
[www.transmit.de](http://www.transmit.de)

### Contact Person

Dipl.-Phys. Jörg Krause  
Tel: +49 (0) 641 9 43 64 25  
Fax: +49 (0) 641 9 43 64 55  
E-Mail: [joerg.krause@transmit.de](mailto:joerg.krause@transmit.de)

