



LASER-BASED DETECTION OF ELECTRONIC COMPONENTS

Task

To recover valuable raw materials from electronic waste, the industry must be able to identify the components in which the materials are present in high concentrations. Since this information is not available in the large variety of today's electronic devices, the components cannot be selectively removed and processed in separate fractions.

Method

Fraunhofer ILT is coordinating the European joint innovation project »ADIR«, in which technological solutions are being worked out in order to automatically recover the individual recyclables. For this purpose, methods are being developed to identify physical and chemical properties of valuable assemblies and electronic components and to selectively remove them.

Results

A combined process is being used to detect the substances in a component without contacting it. In the process, a pulsed laser beam first penetrates the upper layers of the components locally. Then, the subsequent analysis is carried out by the process of Laser-Induced Breakdown Spectroscopy (LIBS). Here, the laser beam excites the internal material for optical emission, which is analyzed spectroscopically.

- 1 Separated, pre-disassembled mobile phones.
- 2 Circuit board of a mobile phone and positions of tantalum-containing components.

The beam paths for laser excitation and detection are aligned quickly and precisely to individual positions on a circuit board. As a result, both individual components can be specifically investigated and scanning measurements of larger areas carried out. Whole circuit boards with an edge length of up to 50 cm can be measured quickly and, for example, represented on a multi-element map.

Applications

This fast and non-contact analysis can record spatial distributions and opens up a broad field of applications: from characterizing natural raw materials through the quality inspection of metallic components and semi-finished products all the way to locating recyclable materials for recycling applications.

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