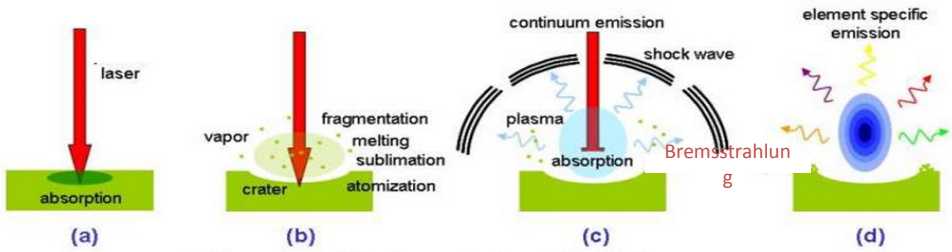
DM6M LIBS good to know!

Laser **I**nduced **B**reakdown **S**pectroscopy

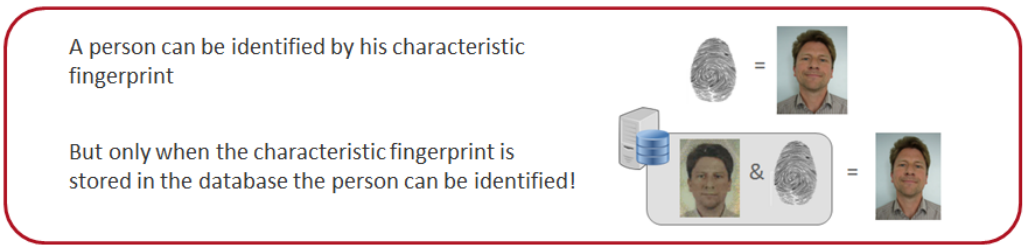
The system: The DM6 M LIBS system comprises a DM6 M microscope and a LIBS system with laser and spectrometer. The LIBS system can be **retrofitted on a DM6 M/DM6000 M** also at a later point in time! A magnification changer or dual camera port can not be used with the LIBS module!

The LIBS principle: A laser pulse (3ns) ablates a fraction of the sample surface (15µm in diameter). The material gets heated (>10.000° C) and a plasma plume is generated. As soon as the laser stops the plasma cools down and emits a characteristic element spectra.

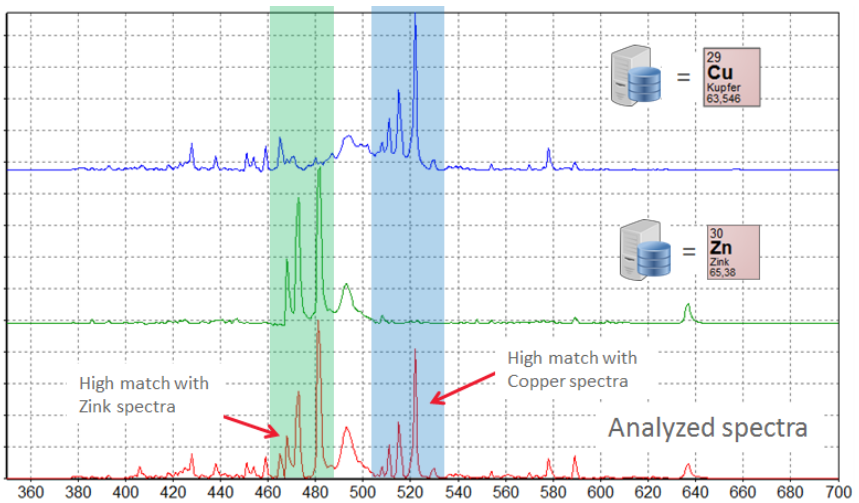


How the DM6 M LIBS system measures:

By the position of the single peaks in the spectra an element or substance can be identified. The identification is processed by database comparison. The identification is comparable to the identification of a specific person by the fingerprint.



By comparison of the spectra from the analyze to the spectra in the database a material can be identified. The accuracy how similar the spectra are, is expressed by the quality of match (1000 = perfect match)!



Analyzed spectra contains Copper and Zink = Material identified as Brass!

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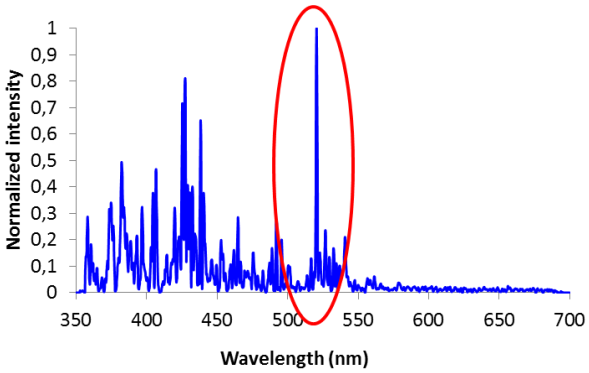
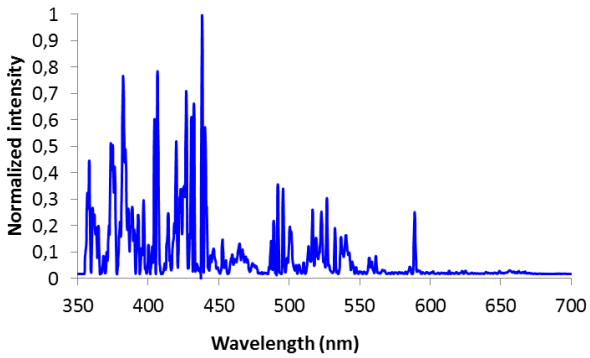
What is measured?

The DM6 M LIBS system provides a qualitative chemical analysis of the sample. Within a few seconds the chemical composition can be determined. Best results are obtained from the metal elements in the periodic table. Carbon, Oxygen or gases can not be detected.



Peak @ 520 nm identifies Chromium in the Steel sample



Low alloy Steel

The position of the single peaks in the spectra identifies the general composition of the sample. The DM6 M LIBS system provides qualitative results. By it's results the user can determine if a specific element is present in the sample or not and can identify by this the material.

A qualitative analysis provide information about: Is there Chromium in the Steel?
A quantitative analysis provide information about: How much Chromium is in the Steel?

What needs to be asked/ which information must be acquired:

We are in contact with our customers when they are searching a solution for visual sample inspection. But what they are doing afterwards with their samples was until now not in our focus.
To verify if a customer is a potential DM6 M LIBS customer can be clarified with just a few questions. By these, important information can be gained bevor a demo request is forwarded to the application team.

1. Question: General workflow, is there a need for this system at all?

- What are you doing with your samples after visual inspection?
- Are further analytical techniques applied on the sample ?

2. What are you doing? (Very important for the application team to gain a 1st overview about the customer requirements. By this information the specialist can estimate the feasibility and potential difficulties!)

- Which analytical approaches are carried out?
- Which elements, materials or substances are analyzed?
- Are there any difficulties today with this approache?

3. It is of high importance to ask if a qualitative analysis fulfill the customer needs. If this is completely negated a demonstration of the DM6 M LIBS system don't need to be taken into account.

- Can the problem be solved by a qualitative analysis?

-> Also with a negative answer a further question make sense to verify if the DM6 M LIBS system can help to liberate measurement capacity. Very often all samples are measured on a SEM-EDX but in fact a detailed qualitative and quantitative analysis is not necessary on all samples.

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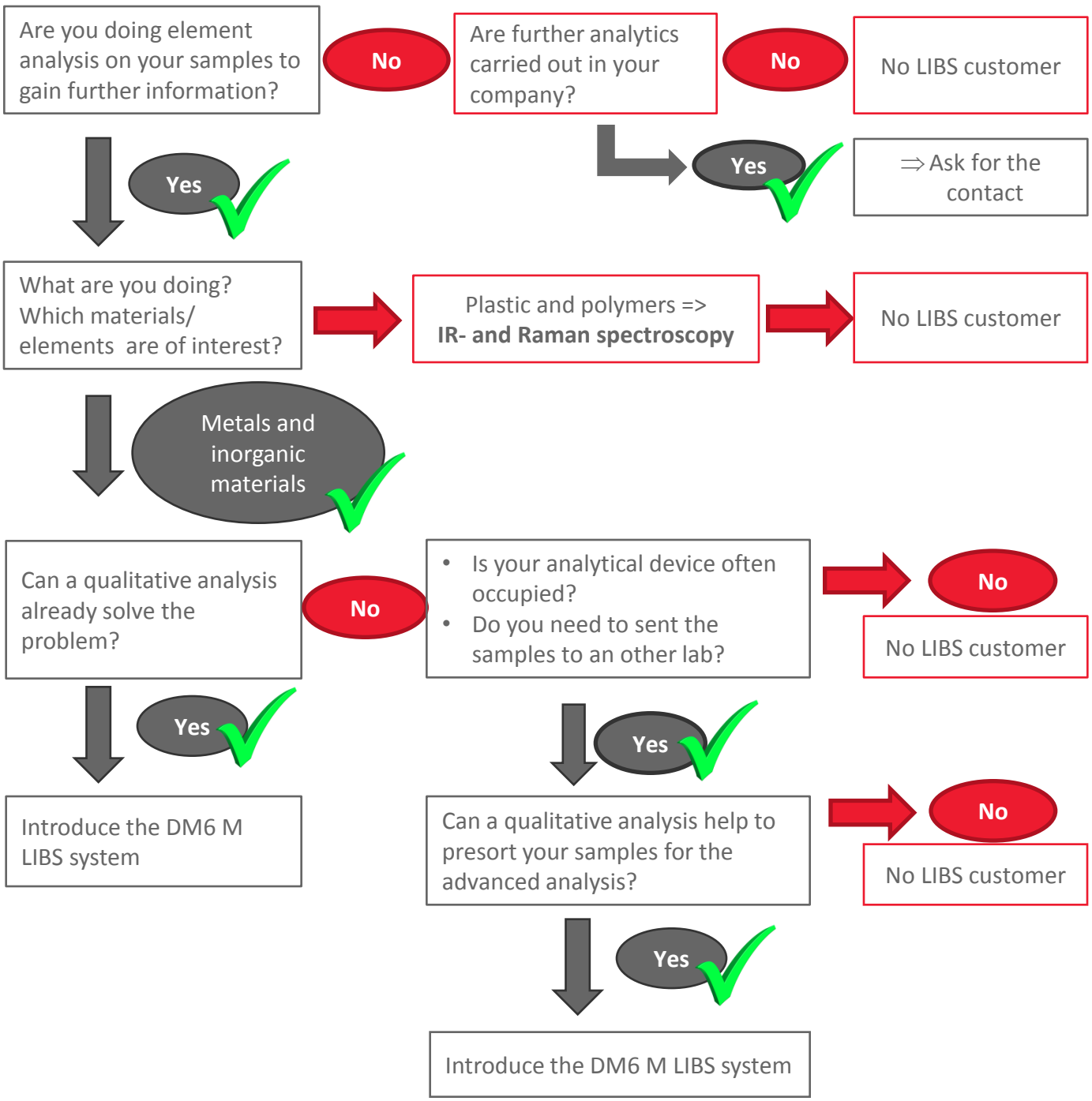
Question sequence (A possibility)



Further information:
For additional information about the system, application and video please visit the product page:

https://www.leica-microsystems.com/products/light-microscopes/upright-microscopes/details/product/libs-module/