

Multi-Element-Analysis MEDINA

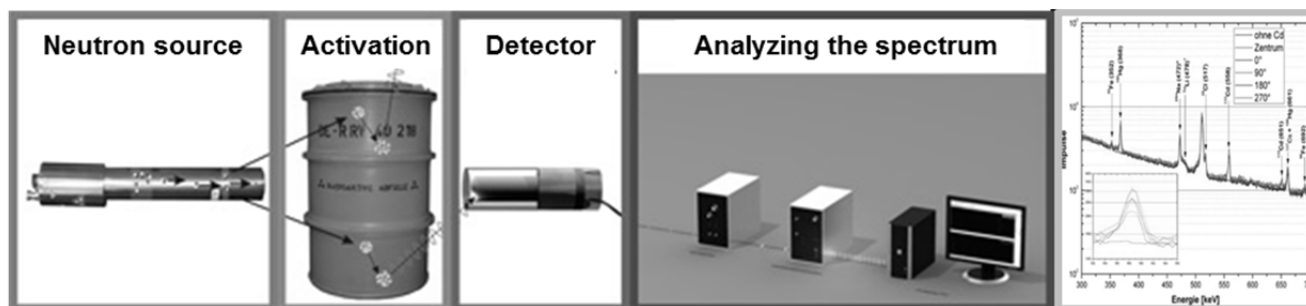
Technology

At Forschungszentrum Jülich (member of the Helmholtz Association of German Research Centres), a non-destructive measurement procedure was developed in cooperation with RWTH Aachen University (Patent PCT/DE2011/001476). This procedure - “Multi-Element Detection based on Instrumental Neutron Activation” (MEDINA) - allows the qualitative and quantitative determination of elements in large volume samples. The method is based on the detection of prompt and delayed gamma radiation after neutron activation, and can be applied for almost all elements in the periodic table, e.g. heavy metals or rare earth elements.

Irradiation by a neutron source results in short-term activation of elements in the sample. During neutron capture or after an individual half-life, the activated atomic nuclei start to emit radiation that is characteristic for and specific to every element.

Using gamma ray spectrometry, a gamma spectrum of the sample is taken and analyzed using special software. The position of the signals and size of the peaks are used to estimate the type and amount of existing activation products, thus enabling the determination of elements contained within the sample.

Analyzing the ratios of different elements permits limited identification of certain compounds or groups of elements.



Next steps

Originally developed for nuclear waste the method can be applied for a wide range of materials, such as electrical and electronic equipment or E-waste. Forschungszentrum Jülich is interested on commercialisation by licensing or R&D cooperations.

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