

Possibilities and limitations of mobile vibration spectroscopic methods in archeometry and monument protection

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Vibration spectroscopy is a group of analytical measurement methods based on the excitation of vibrations of molecules. These methods are based on stimulating energy states and dealing with the interactions of molecules with electromagnetic fields. Typical methods are infrared, nearinfrared and Raman spectroscopy. A very high set of atomic groups as well as complete (macro-) molecules can be tested by these methods. In recent years, more and more portable instruments are appeared. The advantages of mobile vibration methods: rapid and non-destructive tests can be carried out, no sample preparation required, solid and liquid materials can be studied, the sample size is not limited. This type of study is increasingly being used in geology, such as minerals and the identification of their polymorphism, in the examination of structural information (e.g. of graphite) and for the examination of archaeological and monument protection problems.

A few examples: near-infrared spectroscopy is excellently suitable for determining the type and origin of different sandstones, determining the composition of salt efflorescences, testing of clay minerals, but the water content of the test objects can be to determine too. Raman spectroscopy studies can be used to determine minerals, gems and semi-precious stones, distinguish calcitic and dolomitic marbles, determine pigments, paints and binders in murals, the composition of salt efflorescences, detection of harmful substances (PCB, asbestos, etc.) and to determine the authenticity.