

ENERGY-SELECTIVE NEUTRON IMAGING IN CULTURAL HERITAGE

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Neutron imaging is a method of non-destructive investigation for objects of scientific and technological interest. Within the last decade, neutron tomography and radiography have significantly gained importance among the neutron science community. One of the reasons is the fast development in digital image recording and processing technology, which has allowed overcoming of some previous limitations in spatial and time resolution. Another reason is that in addition to the attenuation contrast technique, new innovative methods for neutron imaging are being implemented. Using monochromatic neutrons for imaging, complementary contrast due to the coherent scattering in polycrystalline materials can be obtained, providing information about structural changes or composition heterogeneity. The energy-dependence of the neutron imaging can be used for localization of Bragg edges with high precision which helps for mapping of residual stresses and textures in metallic samples. Tomography investigations with monochromatic beams allow for phase separation in heterogeneous samples. The application of these methods to cultural heritage objects provides information about the manufacture process and the trade paths in the ancient times.

Examples of performed studies at the imaging instrument CONRAD(HZB) at the steady state (reactor based) neutron source BER-2 will be presented and discussed.

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