

From the cathedral of Augsburg to the old Chinese vase A short report of the neutron activation analysis @FRM II

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The neutron source Heinz Maier-Leibnitz (FRM II) is currently the most powerful neutron source in Germany. During the 10 years reactor operation, the modern neutron source provides researchers not only numerous possibilities for the neutron scattering experiments, but also offers opportunities for trace element analysis in the archaeological samples.

The “classical” neutron activation analysis (NAA) at Garching has already written a successful history in the last half century. The so-called “fingerprint” method of analysis of trace elements can bring light into the darkness of the puzzles of the archaeological objects and give us more details about their origins and relations between them.

The bronze portal of the Augsburg Cathedral dated the first half or at the latest the middle of the 11th century is one of 12 major Roman bronze portals in Europe and one of the best examples of medieval casting art north of the Alps [1]. The relief panels of the two non-wide door leaves show mythological, symbolic and several Biblical scenes. There are still a lot of questions about panels. The relations of the images and their meanings, the place of manufacture and the original arrangement of the panels, are still widely unknown [2]. The elements compositions in samples from relief plate frames are analyzed at the FRM II recently. Together with other material science investigations, the NAA should help the archaeologists getting additional information about the classification of the plates. More than 20 trace elements could be quantitative detected by using instrumental neutron activation analysis [3]. A new method is developed to compare the similarity of the objects according to their multi-elements compositions. With the detection of trace of gold, the previous open question whether the door originally gilded or not, could be answered. The differences in concentration of As and Sb in the bronze samples could provide ideas for a new interpretation of the plate classification.

Some other archaeological samples and antiques, such as old jewels of gold and ceramics from the Far East, were also analyzed. The results will be also discussed in my presentation.

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