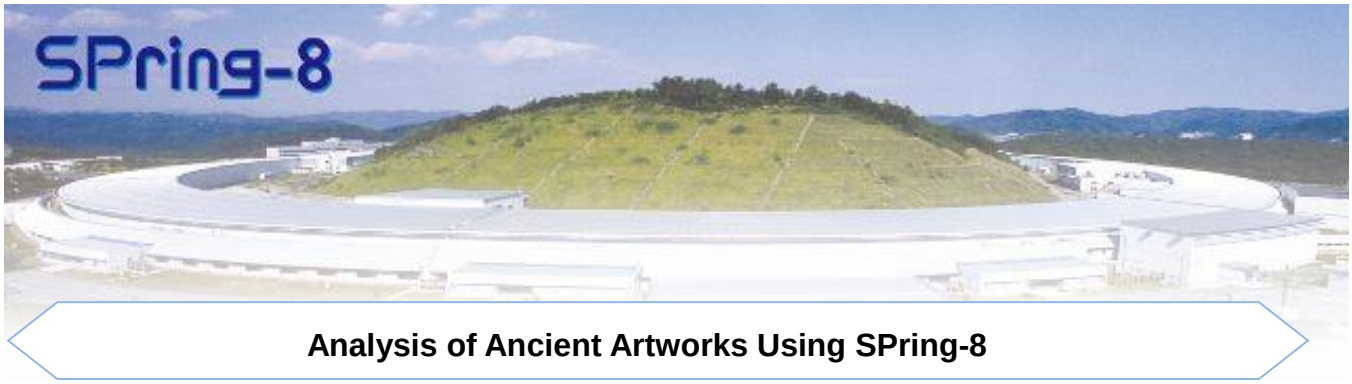


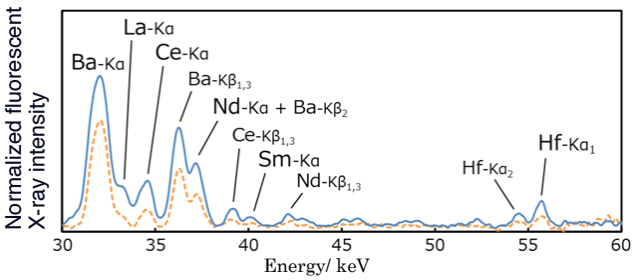
Analysis of Ancient Artworks Using SPring-8

Several pieces of Sasanian glassware (manufactured from the 3rd to 7th centuries in the Mesopotamia-Iran area) are in the possession of Shosoin Treasure Repository (a traditional Japanese treasure house in the district of Nara). Although these pieces are well known, there is no detailed information on the method, date and place of manufacture of the glassware. Highly sensitive detection of heavy elements using high-energy X-rays may provide a clue to the origin of the glassware, because most of the trace elements contained in the glassware are heavy elements such as rare-earth elements, the contents of which largely differ depending on the area where the raw materials were obtained.

Using the high-energy X-rays at BL08W in SPring-8, Ryuji Shikaku (Okayama Orient Museum), Professor Izumi Nakai and Dr. Yoshinari Abe (Tokyo University of Science) developed a technique for analyzing glassware in a nondestructive manner.

The Okayama Orient Museum provided the materials examined in this research. The featured materials were glassware, including shards, manufactured during the Sasanian dynasty in the period from 226 to 651 AD. The analysis at SPring-8 revealed that a large amount of heavy elements, such as rare-earth elements, is contained in the "Bowl with Pinched Decoration", which is typologically identified as early Sasanian glassware manufactured from the 3rd to 4th centuries on the basis of typological features. On the other hand, only a small amount of heavy elements is contained in the "Circular Facetted Bowl", which is typologically identified as late Sasanian glassware manufactured during the 6th to 7th centuries. Such a compositional difference reflects the difference in the raw materials of these vessels. This new technique enables the measurement of valuable archaeological materials and museum pieces without damaging them and will be applied to the cultural research of ancient glassware in the future.

The results of this research make the significance and usefulness of synchrotron radiation science understandable and realistic to everyone and show that the utilization of synchrotron radiation supports a wide range of academic research.



Spectra from two types of Sasanian glass vessels