

Mysteries of the Past & Synchrotron Science

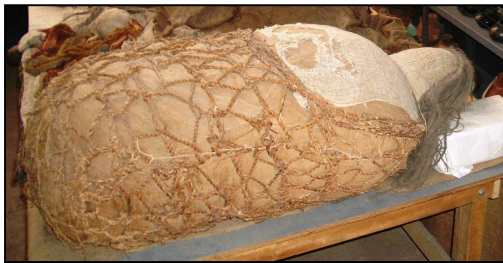
Synchrotron science is playing a role in solving mysteries of the past. Synchrotrons are an attractive tool for researchers because of their ability to analyze a sample without destroying it. It also allows researchers to obtain unique spectroscopic information from a sample that can be combined with complementary information from other scientific tools.



It is well known that composer **Ludwig van Beethoven** suffered from many health problems, but it took a synchrotron to get to the root of his illness. Using a technique called elemental X-ray fluorescence analysis, scientists analyzed Beethoven's hair and a piece of his skull and found levels of lead 100 times higher than normal. Interestingly, Beethoven wrote a letter to a friend describing his wish for researchers to use his body for science in order to determine what it was that ailed him throughout his life.

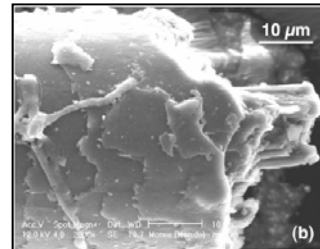


www.anl.gov/Media_Center/News/2005/news051206.html



Looking at hair with a synchrotron can reveal a lot about a person – such as what they ate and the environment in which they lived – even if the person is a 2,000 year old Peruvian mummy. Using X-ray diffraction, researchers have learned that the inner

layers of hair can reveal information about diet, disease and exposure to pollutants.



<http://www.unisa.edu.au/news/2003/191103.asp>

The Mary Rose served as English King Henry VIII's principal warship for 35 years until she went down outside of Portsmouth in 1545. In 1982 the hull was recovered from the sea and has been undergoing a conservation process since. Unfortunately, when a wooden ship sinks, sulphur accumulates in the timbers. Chemical reactions between the sulphur and iron in the hull and the air form sulphuric acid which literally dissolve the ship from the inside out. Fortunately, X-ray absorption spectroscopy techniques are helping to understand these chemical reactions and contribute to developing ways of halting this destructive process.



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