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Cultural Heritage research using neutron methods at ACNS

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A major challenge in the investigation of material documents of cultural, historical and archaeological significance is the need of non-invasive scientific analytical methods to better understand our past thought the characterisation of ancient artefacts while preserving their unique value and integrity for transmission to future generations. This challenge is particularly evident in the study of ancient metals. Although laboratory-based techniques can provide valuable information, in some cases these conventional methods present strong limitation in term of penetration depth and representativeness.
Neutron methods have emerged as a highly sensitive, accurate and non-invasive tool for archaeometallurgy investigations. The fundamental properties of the neutron — no electric charge, deep penetration power into matter, and interaction with the nucleus of an atom rather than with the diffuse electron cloud —make this sub-atomic particle the ideal probe to survey the bulk of dense materials like metals.
In this paper a selection of relevant cross-disciplinary studies conducted at the Australian Nuclear Science and Technology Organisation (ANSTO) and undertaken in collaboration with Australian and international stakeholders will be showcased: from the advanced manufacture of arms and armours to the secret of votive items, through the invention of coinage.

Topics

Earth, Environment and Cultural Heritage

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