

Monitoring and mitigating radiation damage during synchrotron examination of ancient materials

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Radiation damage, or radiation-induced side effects, refers to any undesirable change in the properties of a material caused by radiation, particularly during the scientific examination of objects and samples. With the support of the International Atomic Energy Agency (IAEA) and of the European Commission's IPERION CH programme, programmes were initiated to better address research and analysis issues related to the safer analysis of ancient materials from cultural heritage, paleontology and archaeology [1]. We will review the progress of these developments, which have since been transformed into a number of individual projects developed in institutions in Europe and beyond (for instance at IPANEMA [2–7]), and which encompass issues related to fundamental damage formation mechanisms, damage mitigation such as through application of the "As Low As Reasonably Achievable" principle, damage monitoring (before, during and after experiments), together with corresponding instrumental and data development. A key objective is to produce tools and guidelines to raise awareness of good practices in the research community [8], particularly within the context of the development and upgrade of high-intensity photon sources. We will discuss opportunities to continue this collaborative work to better monitor and mitigate the effects of radiation.

References

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