

## New trends and applications of ionizing radiation for preservation of cultural heritage tangible materials

Disinfection of cultural heritage artefacts and archived materials using ionizing radiation has been successfully applied and accepted by the Brazilian conservation and preservation institutions and community in recent years. Several works of art, museum collections artefacts, books, manuscripts, drawings, archive documents, musical instruments, ethnographic objects, archaeological findings and natural history collections have been decontaminated. Several research studies have been developed addressing the behaviour of cellulosic based materials treated with the ionizing radiation. However, many Brazilian collections have objects made from the most diverse constitutive materials and these are affected by biodeterioration. In order to the effective decontamination of the most diverse types of objects there was a need to establish protocols for care of institutions and individuals carrying cultural and historical collections and for the effective processing by ionizing radiation in the facilities respecting the ethical principles of conservation and restoration covering activities from the problem detection to the final cleaning. Additionally, ionizing radiation has allowed the development of innovative nanostructured cross-linked materials, with applicability in cleaning delicate surfaces. This work presents the most recent results of the effect of ionizing radiation on morphology and physicochemical properties of photographic and cinematographic films, featherwork and botanical collections – exsiccate; as well as the protocols developed as a practical guide for conservatives and professionals of the irradiation for treatment of tangible objects. Preliminary results of nanostructured cross-linked polymeric hydrogels for cleaning surface of artworks obtained by ionizing radiation are also presented. The IAEA sponsored projects have helped to increase the acceptance of nuclear technology by the Brazilian society, especially by the community of restorers, curators and conservators of material cultural goods. The research developed and disseminated with the support of IAEA contributes to the understanding that the cultural heritage is the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and restored for the benefit of future generations.

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