

Opportunities for collaboration between the ionizing radiation field and the field of cultural heritage

Valentin Moise

The nuclear field has a well-established presence in modern society, with great contributions to energy and medicine. A lesser known application is the use of ionizing radiation to disinfect tangible cultural heritage and related objects. The industrial application of radiation processing (γ-rays or electron beams) includes: radiation sterilization of medical supplies and pharmaceuticals, processing of polymeric materials and disinfection of food. Of course, even when it comes to γ radiation produced by the radioisotope nucleus or high-energy accelerated electrons, the irradiated material does not become radioactive. Ionizing radiation acts only on chemical bonds and the biocidal effect is mostly given by the breaking of DNA strands.

As all industrial irradiators operate in one or more of the above areas, radiation treatment for disinfection of CH articles cannot be considered a separate industrial application. It is more of an opportunity for cooperation, and in Romania there is a history of over 15 years of such cooperation for the large-scale treatment of collections affected by biological attacks.

Biological attack is a crisis situation for any owner of cultural materials, whether historical or modern materials. Biological attack is almost always installed when storage conditions are compromised: due to natural or man-made disasters, lack of funding or simply negligence. Virtually any type of crisis (economic or social) can lead to a crisis for the conservation of cultural heritage and there are very few effective means of combating large-scale biological attacks. Due to the global presence of industrial irradiators, radiation treatment can be applied in any region, for large quantities and in a short time, and should be taken into account in any emergency planning.

Biography

Valentin Moise is a Physics Engineer with a PhD in Physical Chemistry. He worked almost 25 years in Romania in the radiation processing field and now is leading the IRASM Radiation Processing Center of "Horia Hulubei" National R&D Institute for Physics and Nuclear Engineering. IRASM is the first and the only industrial irradiator in Romania, working mainly for radiation sterilization of medical supplies and pharmaceuticals but from more than 15 years

have an increasing number of requests for radiation treatment for disinfection of materials from cultural area. Valentin's PhD thesis is related to preservation of cultural heritage preservation, he holds an Expert License from Ministry of Culture and IRASM team was leading several R&D projects for the study of gamma radiation effects on CH materials: wood/polychrome wood, paper, leather, etc.