EXPERIMENTAL STUDY OF RADIATION RESISTANCE IN INTENSE NEUTRON FIELDS OF CRITICAL MATERIALS FOR THE CONSTRUCTION OF THE ESS TARGET SYSTEM

Mechanical components employed around the target of second generation accelerators as well as intense neutron sources are expected to absorb high levels of neutron dose, inducing important modifications in their physical and mechanical properties, eventually leading to a failure of their function. An irradiation and testing protocol already developed and validated for elastomeric O-rings can be applied to other categories of critical components and materials, aiming at the selection of the best candidates for application in the European Spallation Source project, based in Lund, Sweden. In this scenario, the selected materials are irradiated in the neutron and photon mixed radiation field of the nuclear research reactor of the University of Pavia. The study is currently focused on lubricant oils and greases, representing one of the most critical components to be employed in a highly radioactive environment.