

PIXE application in the context of ethical-jewelry development and promulgation

S. Muraio, K. Sera¹, S. Goto², C. Takahashi² and K. Nakashima³

National Institute of Advanced Industrial Science and Technology
1-1-1 Higashi, Tsukuba 305-8567, Japan

¹Cyclotron Research Center, Iwate Medical University
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

²Takizawa Institute, Japan Radioisotope Association
348-1 Tomegamori, Takizawa, Iwate 020-0173, Japan

³ Faculty of Science, Yamagata University
1-4-12 Kojirakawa, Yamagata 990-8560, Japan

Abstract

Vacuum PIXE at NMCC was selected as an aiding tool for the ethical jewelry in that it can offer fingerprinting which is one of the requirements of the ethical-jewelry business. For the experiment, five baroque pearls from Micronesia were used. A non-destructive-standard-free method was established and then applied to the pearls. The nacre of the pearls was irradiated by 2.9MeV proton beam and the signals were successfully quantified by SAPIX. However after the measurement faint irradiation marks were observed on the pearls' surface. The authors consider it necessary, in the near future, to introduce a cooling system not to stain the jewels' surface by harnessing the in-air section that is attached to the vacuum PIXE at NMCC.