

ON THE USE OF ION AND CLUSTER BEAMS ANALYSIS AT LAEC FOR FORENSIC SCIENCES: INFRASTRUCTURE AND APPLICATIONS

B. NSOULI, A. BEJJANI, M. ROUMIE

Lebanese Atomic Energy Commission, Lebanese CNRS, Beirut, Lebanon

G. CHALHOUB, M. HAMDAN

Central Bank of Lebanon, Beirut, Lebanon

Ion Beam Analysis techniques can present some unique analytical capabilities to characterize and investigate materials in cultural heritage, environment and biomedicine. These techniques are well established at the accelerator laboratory of the Lebanese Atomic Energy Commission, for more than 20 years, and they are widely used in different related studies and applications. Moreover, a new powerful tool is added to the analytical arsenal of the lab which is the Time-of-Flight Secondary Ion Mass Spectroscopy (TOF-SIMS) where molecular and elemental characterization of materials, as well as imaging, becomes possible and more information about the investigated objects are obtained. Some case studies were already performed on the investigation of archeological pottery and coins, for questions of provenance and authenticity, as well as on the quality of pharmaceutical drugs by quantifying their active ingredients. In addition, the forensic capabilities of IBA methods combined with ToF-SIMS were examined, in cooperation with the “Central Bank of Lebanon”, for exploring the possibility of these techniques to reveal counterfeiting techniques of banknote denominations. The results of such application will be highlighted and discussed.