

THE STATUS OF THE TARGET PREPARATION LABORATORY AT IFIN-HH BUCHAREST, ROMANIA

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Abstract

The Target Preparation Laboratory was recently commissioned (2013) at IFIN-HH, in order to support the Nuclear Physics research activity, performed mainly at the 9MV tandem accelerator in IFIN-HH, and other international research facilities, by providing the enriched isotopic targets dedicated to different types of experiments such as lifetime measurements using different γ -ray spectroscopy techniques (Doppler shift attenuation, plunger, fast-timing), nuclear structure studies by using the activation technique and also cross-section measurements of interest for nuclear astrophysical processes. The success of the nuclear physics experiments is strongly influenced by the characteristics of the obtained target (purity, composition, thickness, uniformity, etc.). To carry out different target preparation techniques, the laboratory was equipped with two evaporation systems (thermal evaporation, electron-beam gun and sputtering) and an electrical rolling mill. Based on the capabilities of the target laboratory, several enriched isotopic targets such as ^{40}Ca (0.3 mg/cm^2); ^{110}Pd (0.8 mg/cm^2); ^{70}Zn (0.7 mg/cm^2); ^{114}Sn and ^{118}Sn (4.5 mg/cm^2); ^{140}Ce (0.3 mg/cm^2); ^{82}Se (5 mg/cm^2); ^{123}Sb (0.5 mg/cm^2); ^{48}Ti (0.47 mg/cm^2) and target backings like Au ($2.5\div 10 \text{ mg/cm}^2$) and Ta ($2.5\div 10 \text{ mg/cm}^2$) were produced. The thin-films were obtained according to different procedures described in INTDS literature [1-5].

To answer all physicists' necessities of targets, the target preparation laboratory will develop new target preparation recipes taking into account the different physical and/or chemical properties of the raw materials. Target characterization methods (e.g. PIXE, PIGE, RBS, AFM, SEM-EDX, thickness determination using energy-loss of α -particles) will be employed to determine the features of the obtained targets.

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