

## Thin isotopic Nickel target preparation and characterization for nuclear reaction studies

Thin and pure  $^{61,62}\text{Ni}$  targets of uniform thickness are required to perform nuclear reaction experiments at HIRA, IUAC, New Delhi. Although self-supporting targets are preferable for such case but, instead, carbon-backed isotopic targets are prepared using physical vapour deposition technique as the target that will be obtained using this method will be comparatively more stable, intact and consistent. More than 20 numbers of thin targets of both  $^{61}\text{Ni}$  and  $^{62}\text{Ni}$  isotopes are prepared using the limited amount of available enriched target material (less than 100 mg). The carbon-backed slides along with the parting reagent (potassium chloride) are prepared using a diffusion pump based coating unit and the target material is deposited over these carbon-backed slides in the turbopump based coating unit. KCl is chosen to be the parting agent in this case because the potassium mass and Nickel mass differs by substantial amount which will make analysis easier after experiment, if there is any impurity due to KCl within the target element. To obtain consistent and intact targets, some trials were done with deposited slides and were found that the material degrades in any of the slides when kept idle for a few days. The thicknesses of the targets are verified using profilometer,  $\alpha$ -energy loss technique, and RBS technique. They were found to be in good agreement with each other using these techniques. The purity and the uniformity of the fabricated targets are further verified using RBS and EDS techniques, both of which confirmed their purity and uniformity.

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