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INVITED LECTURE - Radionuclide production studies by heavy ion beams

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'In last two decades our research group is involved in the heavy ion assisted production and separation of neutron deficient no-carrier-added radionuclides. The advantage of heavy ion assisted production is choice of wide range of projectiles and therefore increasing the possibilities of reaching desired radionuclide far from the stability line. The main disadvantage is low production cross section, which made heavy ion assisted radionuclide production unsuitable at present for clinical applications, though in some cases HI cross sections are comparable with -particle activation cross sections. The high current ECR ion sources may address this limitation in future. Nevertheless, the neutron deficient radionuclides are comparatively short-lived and therefore highly suitable for tracer studies including biological systems.
In the conference, I shall briefly discuss the recent results obtained by our group on heavy ion assisted production of radionuclides. This includes production of 149Tb, 149Gd, 73As, 75Se, 209-211At, 97Ru, etc. In many cases, we have measured cross section for production of these radionuclides and compared with the theoretical prediction. The efficient and simple separation chemistry has been developed in each case. Apart from conventional liquid liquid extraction techniques, we have also used aqueous biphasic extraction system (ABS), taking polyethylene glycol (PEG-4000) and solution of various salts for separation of no-carrier-added radionuclide from the target matrix. Due to the absence of organic solvents, ABS can be viewed as greener technique.

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