

CROSSING THE DRIP-LINE IN THE VICINITY OF ^{100}Sn

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The impressive progress in the in-flight production of nuclei with extreme neutron-to-proton ratios as well as the construction of a new generation of fragment separators new regions of the nuclear landscape and in particular the region of the doubly-magic ^{100}Sn isotope become accessible.

In the present work, the study of proton drip-line nuclei in the vicinity of ^{100}Sn performed at the RIKEN Nishina Center led to the discovery of several new isotopes, namely ^{96}In , ^{94}Cd , ^{92}Ag and ^{90}Pd and new proton emitters ^{93}Ag and ^{89}Rh with half-lives in the sub-microsecond range. The newly identified even- Z isotopes are located very closely the proton drip line, while the new odd- Z isotopes are lying beyond the proton drip line. For the identified proton emitters, the corresponding one-proton separation energies were estimated. The data analysis allowed also to deduce a lower limit of the half-life of ^{97}In . The obtained systematics of the half-lives of odd- Z nuclei with $T_z = -1/2$ toward ^{99}Sn shows a stabilizing effect of the $Z = 50$ shell closure.

The measured production cross sections for nuclei in the vicinity of ^{100}Sn at different energies and target thicknesses were compared to the cross sections calculated by EPAX taking into account contributions of secondary reactions in the primary target.