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Selective contaminant adsorption for RIB purification at ISOLDE

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Target and ion source units have been recently developed at CERN-ISOLDE with the aim of delivering isobarically clean beams of short lived neutron-rich Cd and Zn. Chemical selectivity is achieved by specific interaction of the contaminant with a catching material inserted in the transfer line [1, 2]: a quartz insert allowed the retention and the decay of alkali contaminants by controlling its temperature. The temperature dependence showed to originate from a longer effusion time, and higher decay, of the impurities by selective adsorption onto the quartz. The design of this transfer lines is presented. Alkali suppression factors are deduced from 80Rb, 8Li, 46K and 126,142Cs yield measurements. The enthalpy of adsorption for Rb and Cs is calculated from 80Rb and 126Cs suppression factors.

[1] E. Bouquerel et al., 'Purification of a Zn Radioactive Ion Beam by alkali suppression in a quartz line target prototype', European Phys. Journal A (in press).

[2] –K.L. Kratz et al., 'The Beta-decay half-life of 13048Cd82 and its importance for astrophysical r-process scenarios', Z. Phys. A325 (1986) 489.

Primary author: Mr BOUQUEREL, Elian (CERN, Université Paris 11, Orsay.)

Co-authors: Dr LETTRY, Jacques (CERN); Mr ELLER, Martin (CERN); Mr CATHERALL, Richard (CERN); Mr MARZARI, Stefano (CERN); Dr STORA, Thierry (CERN)

Presenter: Mr BOUQUEREL, Elian (CERN, Université Paris 11, Orsay.)

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