

Decay properties of some transactinide nuclides studied with the OLGA technique

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The On-Line Gas chemistry Apparatus OLGA was applied to continuously separate transactinide elements and to analyze the products for correlated α or α -sf decay chains. This technique has a typical separation time of three seconds and an overall yield of about 10 %. This permits investigation of nuclides produced with cross sections as low as 10 pb [1].

¹⁸O and ²²Ne beams were used to bombard ²⁴⁴Pu, ²⁴⁸Cm or ²⁴⁹Bk targets at the PHILIPS cyclotron of PSI as well as the UNILAC accelerator at GSI in order to form evaporation residues mainly from the 4n and 5n channels.

Besides investigation of chemical properties, the OLGA device was applied to study nuclear decay properties of the nuclides ²⁶³Db, ^{265,266}Sg and ^{266,267}Bh.

We will report on the measured decay properties of these nuclides that have half-lives between less than one second (²⁶⁶Bh) and about 30 s (²⁶³Db). They decay mainly via emission of α -particles and are clearly influenced by the neutron shell at N=162.

An improved version of OLGA, the IVO device (In-situ Volatilization and On-line detection) has recently been developed [2] that should give access to nuclear and chemical studies with nuclides (or elements) produced with cross sections as low as 1 pb. Two examples of future IVO applications to chemical investigation as well as nuclear decay studies will be outlined, the separation of hassium (element 108) in form of its very volatile tetroxide and of element 112 as very volatile noble metal.

Based on the high performance of OLGA or IVO set-ups such on-line chemistry separators might be well suited for future reaction studies at RIB facilities for product nuclides decaying via emission of α -particles or by spontaneous-fission.

[1] R. Eichler et al., *Nature* **407**, 63-65 (2000)

[2] Ch. Düllmann et al., *Nucl. Instr. and Meth. A*, accepted

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