

# The strategic plans of SCK•CEN towards a routine production of $^{225}\text{Ac}$ from $^{226}\text{Ra}$

With the steadily growing demand in alpha emitting radionuclides for cancer therapy, a project has been launched at the Belgian Nuclear Research Centre (SCK•CEN) aiming towards the routine production of  $^{225}\text{Ac}$ . In possession of a large stock of purified  $^{226}\text{Ra}$  from earlier activities (1), the goal of the project is to exploit the most efficient production route and implement it in the coming years on site. The envisaged nuclear reactions involve the direct  $^{226}\text{Ra}(p,2n)^{225}\text{Ac}$  route using a cyclotron or the indirect reaction via  $^{226}\text{Ra}(\gamma,n)^{225}\text{Ra}(\beta^-)^{225}\text{Ac}$  using Bremsstrahlung photons from an electron accelerator (2).

In order to be able to handle large activities of alpha emitters as well as the progeny of  $^{226}\text{Ra}$ , a sophisticated Rn trapping system will be implemented into an existing hot-cell, where Ci levels of  $^{226}\text{Ra}$  will be processed in the future. The radiochemical separation system has already been developed at tracer levels and tested for the separation of Ra/Ac and Ac/Pb, Bi and Po.

The handling of large quantities of radium in connection with the design of a suitable target for irradiation purposes are considered as the most demanding challenges of this project. We present a roadmap of the envisaged activities and give an overview on strategic partners involved in the  $^{225}\text{Ac}$  development program.

(1) Baetsle L.H., Dejonghe P., Demildt A.C.: Large scale production of  $^{227}\text{Ac}$  and development of an isotopic heat source fueled with  $^{227}\text{Ac}_2\text{O}_3$ , Proceedings of the 4th United Nations International Conference on the Peaceful Uses of Atomic Energy, Geneva (Switzerland), A/Conf.49/P/287, New York, 191-203 (1972).

(2) Pottier, J.: A new type of rf electron accelerator: the rhodotron, Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms 40-41, 943-945 (1989).

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