

High-Purity Actinium-225 Production from Radium-226 using a Superconducting Electron Linac

Niowave is operating a closed-loop cycle to domestically produce high-purity Ac-225 and other alpha emitters from Ra-226 using a superconducting electron linear accelerator. The commercial-scale system will produce 10 Ci per week of Ac-225 from a nitrate-based solution of Ra-226. The electron beam impinges on a photon converter to irradiate the Ra-226, inducing a photon-neutron reaction to Ra-225, which decays to Ac-225. Ac-225 is eluted continuously from the target vessel then centrifugal contactors are used to harvest and purify Ac-225 through a separation cascade. Unlike other production methods, including proton linacs (spallation of Th-232) and proton cyclotrons (Ra-226 bombardment), Niowave's method does not generate any Ac-227 contamination in the Ac-225 product. Niowave's superconducting linacs can handle higher production output (>500 Ci per year using a 20 MeV, 210 kW beam) than any other method. Demonstration-scale production of 10 mCi batches of Ac-225 at Niowave's HQ has begun and will be complete in April 2019. Niowave is in a unique position to quickly take the lead in alpha-emitters for cancer therapy because they have expertise in superconducting electron linacs and an NRC materials license to possess and irradiate Ra-226 while capturing gaseous radioisotopes and progeny. This presentation will focus on Niowave's scale up plans to full production including radium acquisition, NRC and FDA licensing strategies, and a path to profitability.

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