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A Novel Method to Generate and Isolate Radioisotopes for Use in Nuclear Medicine

Radionuclide	Half-life	Decay	Applications
Bismuth-213	46 minutes	α	Cancer therapy
Cobalt-60	5.27 years	γ	Sterilization
Erbium-169	9.4 days	β^-	Relief of pain from arthritis
Iodine-125	60 days	γ	Treatment of brain and prostate cancer
Phosphorous-32	14 days	β	Treatment of excess red blood cells
Technetium-99m	6 hours	γ	Imaging applications
Thallium-201	73 hours	γ	Diagnosis of coronary artery disease
Xenon-133	5 days	β^-	Pulmonary ventilation studies

Challenge

Nuclear medicine procedures are capable of mapping physiological function, metabolic activity, and can provide information about organ function and dysfunction. In medicine, Radiopharmaceuticals (Radiotracers - molecules) are widely used for diagnostics and treatments for illnesses by recording radiation emittance within the body. Currently, nuclear medicine records radiation emitted from within the body rather than radiation that is generated by an external source, such as X – rays.

Solution

This novel method describes the creation, irradiation, and separation of isotopes using three-dimensional (3D) nano-porous, micro-porous, meso-porous, or macro-porous bodies. This method can be applied in medicine to separate isotopes (Radioisotopes) by radiation that is generated by an external source, such as X - rays.

Benefits and Features

- Can produce isotopes on a commercial scale.
- Enables production of proton-rich isotopes that nuclear reactors cannot produce.

Market Potential / Applications

- Medical isotope production
- Photo-production of proton-rich isotopes
- Nuclear security and nuclear research
- Isotope production facilities to produce radioisotopes
- Nuclear medicine to treat diseases like hyperthyroidism, thyroid cancer, lymphoma, and bone pain.

Developments and Licensing Status

Status: Available

Commercial sponsor sought? Yes

Patent Status

US patent pending

Inventors

Doug Wells; Nikolai Kalugin; Alexey Serov

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To inquire about this technology call (575) 835-5390 or email us at OIC@nmt.edu

https://www.nmt.edu/oic/