CLAIMS

1. A brachytherapy device, comprising:

a base adapted for being at least partially introduced into a body of a subject; and

a plurality of radionuclide atoms of a first alpha-emitting isotope, coupled to the base in a manner that not more than 25% of the radionuclide atoms leave the base in 24 hours, in methods other than radioactive decay,

wherein when installed in a human subject, the brachytherapy device emits radionuclide atoms of the first alpha-emitting isotope at a rate of at least 0.1% of the number of radionuclide atoms of the first alpha-emitting isotope coupled to the base, per 24 hours.

2. The brachytherapy device of claim 1, wherein the first alpha-emitting isotope comprises Radium-224.

3. The brachytherapy device of claim 1 or claim 2, further comprising a semi-porous polymer coating layer on the radionuclide atoms, configured to allow diffusion of a percentage of the radionuclide atoms, so as to provide the emission of the at least 0.1% of the number of radionuclide atoms of the first alpha-emitting isotope coupled to the base, per 24 hours.

4. The brachytherapy device of claim 3, wherein the semi-porous polymer coating layer comprises PDMS (polydimethylsiloxane).

5. The brachytherapy device of claim 3 or claim 4, wherein the semi-porous polymer coating layer has a thickness of no more than 0.5 microns.

6. The brachytherapy device of any one of claims 3-5, wherein the semi-porous polymer coating layer allows diffusion of the radionuclide atoms out of the brachytherapy device at a rate of at least 0.5% in 24 hours.

7. The brachytherapy device of any one of claims 3-6, further comprising a base polymer coating layer on the base, and wherein the plurality of radionuclide atoms are attached to the base polymer coating layer and thus coupled to the base in a manner allowing the radionuclide atoms to detach and diffuse, without nuclear decay.

8. The brachytherapy device of claim 7, wherein the base polymer coating layer comprises polycarbonate.

9. The brachytherapy device of claim 7 or claim 8, wherein the base polymer coating layer has a thickness of at least 0.25 microns.

10. The brachytherapy device of any one of claims 1-9, wherein the brachytherapy device emits radionuclide atoms of the first alpha-emitting isotope at a rate of at least 3% of the number of radionuclide atoms of the first alpha-emitting isotope coupled to the base, per 24 hours.

11. The brachytherapy device of any one of claims 1-10, wherein not more than 15% of the radionuclide atoms leave the base in 24 hours, in methods other than radioactive decay.

12. The brachytherapy device of claim 11, wherein the plurality of radionuclide atoms are coupled to the base in a manner that not more than 8% of the radionuclide atoms leave the base in 24 hours, in methods other than radioactive decay.

13. The brachytherapy device of any one of claims 1-12, further comprising a bio-absorbable polymer coating layer on the base, wherein the radionuclide atoms are embedded in the bio-absorbable polymer coating layer, and wherein when installed in a subject, the bio-absorbable polymer coating layer dissolves in a manner causing emission from the device of the at least 0.1% of the number of radionuclide atoms of the first alpha-emitting isotope coupled to the base, per 24 hours.

14. The brachytherapy device of any one of claims 1-13, further comprising a plurality of radionuclide atoms of a second alpha-emitting isotope, which decays into the first alpha-emitting isotope, which are coupled to the base in a manner that the radionuclide atoms do not leave the brachytherapy device, but upon nuclear decay, a daughter nuclei of the decaying radionuclide atom is emitted from the device.

15. The brachytherapy device of claim 14, wherein the plurality of radionuclide atoms of the second alpha-emitting isotope have an activity level of less than 20% of the activity level of the radionuclide atoms of the first alpha-emitting isotope included in the device.

16. The brachytherapy device of claim 15, wherein the plurality of radionuclide atoms of the second alpha-emitting isotope have an activity level of less than 5% of the activity level of the radionuclide atoms of the first alpha-emitting isotope included in the device.

17. The brachytherapy device of any one of claims 1-16, wherein the plurality of radionuclide atoms of the first alpha-emitting isotope provide at least 50% of the activity of the radionuclide atoms in the brachytherapy device.

18. The brachytherapy device of any one of claims 1-17, wherein the plurality of radionuclide atoms of the first alpha-emitting isotope have a density of at least $5*10^{10}$ atoms per square centimeter of the base.

19. A brachytherapy device, comprising:

a seed base adapted for being at least partially introduced into a body of a subject;

a first coating layer on the seed base, configured to prevent passage of Radium-224 or Radium-223 therethrough;

particles of a Radium-224 or Radium-223 radionuclide placed on the first coating layer; and

a second coating layer on the particles, configured to allow diffusion of at least 0.1% of the particles of Radium.

20. The brachytherapy device of claim 19, wherein the seed base comprises a tube defining an internal channel.

21. The brachytherapy device of claim 19 or claim 20, wherein the first coating layer comprises polycarbonate.

22. The brachytherapy device of any one of claims 19-21, wherein the first coating layer has a thickness of at least 0.05 microns.

23. The brachytherapy device of claim 22, wherein the first coating layer has a thickness of at least 0.1 microns.

24. The brachytherapy device of any one of claims 19-23, wherein the first coating layer has a thickness of no more than 1 micron.

25. The brachytherapy device of any one of claims 19-24, wherein the second coating layer comprises PDMS (polydimethylsiloxane).

26. The brachytherapy device of any one of claims 19-25, wherein the second coating layer has a thickness of no more than 0.5 microns.

27. The brachytherapy device of any one of claims 19-26, wherein the second coating layer has a thickness of at least 0.1 microns.

28. The brachytherapy device of any one of claims 19-27, wherein the device allows diffusion of the particles of Radium through the second coating layer at a rate of at least 0.5% in 24 hours.

29. The brachytherapy device of any one of claims 19-28, wherein the device allows diffusion of the particles of Radium through the second coating layer at a rate of at least 5% in 24 hours.

30. The brachytherapy device of any one of claims 19-29, wherein the device allows diffusion of the particles of Radium through the second coating layer at a rate of no more than 10% in 24 hours.