IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1-31. (Cancelled)

32. (Previously Presented) An exothermic transmutation method for at least partially deactivating radioactive material, the method comprising the steps of:

arranging a dusty compound comprising at least a transition metal in a chamber of a reactor outside a closed container;

arranging the radioactive material in said chamber, the radioactive material being and staying encapsulated in said closed container;

providing hydrogen in contact with the dusty compound and with the radioactive material at a pressure higher than the ambient pressure;

generating an electric field in the chamber, the electric field being applied to the dusty compound and the radioactive material;

energizing the dusty compound by heating, then generating a transmutation of said at least one transition metal into another transition metal and proton emission towards the radioactive material, said radioactive material being at least partially deactivated,

removing thermal energy from the reactor.

33. (Currently Amended) The mMethod according to claim 32, wherein the radioactive material is a nuclear waste.

34. (Currently Amended) The mMethod according to claim 32, comprising a step of removing air from the chamber and a step of heating the chamber at an initial temperature.

35. (Currently Amended) The mMethod according to claim 532, wherein the dusty compound comprises Ni and Fe, 50% to 95% Ni and 5% to 50% Fe in weight, Ni atoms being transmuted into Cu.

36. (Withdrawn, Currently Amended) The mMethod according to claim 532, wherein the dusty compound comprises 1% to 10% Cu in mass.

37. (Withdrawn, Currently Amended) The mMethod according to claim 36, wherein the Cu of the dusty compound has at least 99% of particles of an average size between 10 and 100 µm.

38. (Currently Amended) The mMethod according to claim 532, wherein the Ni of the dusty compound has at least 99% of particles of an average size not greater than 10 µm, and the Fe of the dusty compound has at least 99% of particles of an average size not greater than 10 µm.

39. (Withdrawn, Currently Amended) The mMethod according to claim 532, wherein the dusty compound comprises 25% to 40% graphite in mass.

40. (Currently Amended) The mMethod according to claim 32, wherein the pressure in said chamber during electric field and ultrasonic wave generation is greater than 5×10^5 Pa, said chamber containing at least 99% H_2.

41. (Currently Amended) The mMethod according to claim 32, wherein hydrogen is provided before heating and stay in the chamber during the subsequent steps.

42. (Currently Amended) The mMethod according to claim 32, wherein the initial temperature is between 80 and 200°C.

43. (Withdrawn, Currently Amended) The mMethod according to claim 3252, wherein the dusty compound comprises Cr, the same dusty compound composition

is used for various radioactive materials and the same dusty compound is used for a plurality of radioactive material deactivations.

44. (Currently Amended) The mMethod according to claim 32, wherein the electric field is essentially static and is between 20 and 30000 volts/m.

45. (Currently Amended) The mMethod according to claim 32, wherein the radioactive material is a powder having at least 99% of particles of an average size not greater than 10 μm.

46. (Currently Amended) The mMethod according to claim 32, wherein the hydrogen is deprived of voluntary addition of deuterium and tritium.

47. (Currently Amended) The mMethod according to claim 32, wherein the ultrasonic waves have a frequency between 250 and 600 kHz and the ultrasonic waves are generated by a generator having a power between 400 and 2000 W.

48. (Currently Amended) The mMethod according to claim 32, wherein the electric field and the ultrasonic waves are generated after heating the chamber at said initial temperature, heating being maintained during a first part of an electric field and ultrasonic waves generation period, heating being stopped at the end of said first part, removing thermal energy starting after said first part.

49. (Currently Amended) The mMethod according to claim 32, wherein an electric field and ultrasonic waves generation period has duration between 1 and 6 hours.

50. (Withdrawn) An exothermic transmutation method for at least partially deactivating radioactive material, the method comprising the steps of:

arranging a dusty compound comprising at least a transition metal in a chamber of a reactor;

arranging the radioactive material in said chamber, the radioactive material being close to or mixed with the dusty compound;

providing hydrogen in contact with the dusty compound and with the radioactive material at a pressure higher than the ambient pressure;

generating an electric field in the chamber, the electric field being applied to the dusty compound and the radioactive material;

energizing the dusty compound by ultrasonic waves, then generating a transmutation of said at least one transition metal into another transition metal and proton emission towards the radioactive material, said radioactive material being at least partially deactivated,

removing thermal energy from the reactor.

51. (Withdrawn, Currently Amended) The Mmethod according to claim 50, comprising heating the dusty compound and the radioactive material.

52. (New) The method according to claim 32, wherein the dusty compound comprises Ni and Fe, Cu, graphite, Cr, or combinations thereof.