

**IN THE CLAIMS:**

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

1-31. (Cancelled)

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

arranging a ~~dusty-granular transition metal compound~~ comprising Sc, Ti, V, Mn, Co, Ni, and Fe, Zn, Y, Zr, Nb, Mo, Tc, Ru, Rh, Ag, Cd, Hf, Ta, W, Re, Os, Ir, Pt, Au, Cu, graphite, Cr, lanthanides, actinides, or combinations thereof, in a chamber of a reactor outside of a closed container, where the closed container is in the chamber of the reactor;

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

providing hydrogen in contact with the granular transition metal dusty compound and with the radioactive material such that the chamber contains at least 99% H<sub>2</sub> at a pressure higher than the ambient pressure of at least 5 x 10<sup>5</sup> Pa;

generating an electric field in the chamber, the electric field being applied to the granular transition metal dusty compound and the radioactive material such that the electric field is essentially static and is between 20 and 30000 volts/m;

energizing the granular transition metal dusty compound by heating to a temperature between 80 and 200°C sufficient to render the method exothermic, and  
then generating a transmutation of the at least one granular transition metal into a different transition metal and the radioactive material said at least one transition metal into another transition metal and proton emission towards the

~~radioactive material, said radioactive material being into an~~ at least partially  
~~deactivated radioactive material, and~~

removing thermal energy from the reactor; and

~~wherein the pressure in the chamber during electric field generation is greater  
than  $5 \times 10^5$  Pa, the chamber contains at least 99% H<sub>2</sub>, the initial temperature is  
between 80 and 200°C, and the electric field is essentially static and is between 20  
and 30000 volts/m.~~

33. (Previously Presented) The method according to claim 32, wherein the radioactive material is a nuclear waste.

34. (Currently Amended) The method 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 method according to claim ~~5232~~, wherein the ~~granular transition metal 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 method according to claim ~~5232~~, wherein the ~~granular transition metal dusty~~ compound comprises 1% to 10% Cu in mass.

37. (Withdrawn, Currently Amended) The method according to claim 36, wherein the Cu of the ~~granular transition metal dusty~~ compound has at least 99% of particles of an average size between 10 and 100  $\mu\text{m}$ .

38. (Currently Amended) The method according to claim 35, wherein the Ni of the ~~granular transition metal dusty~~ compound has at least 99% of particles of an average size not greater than 10  $\mu\text{m}$ , and the Fe of the ~~granular transition metal~~

~~dusty~~ compound has at least 99% of particles of an average size not greater than 10  $\mu\text{m}$ .

39. (Withdrawn, Currently Amended) The method according to claim ~~5232~~, wherein the granular transition metal ~~dusty~~ compound comprises 25% to 40% graphite in mass.

40. (Cancelled)

41. (Previously Presented) The method according to claim 32, wherein hydrogen is provided before heating and stays in the chamber during the subsequent steps.

42. (Cancelled)

43. (Withdrawn, Currently Amended) The method according to claim 32, wherein the granular transition metal ~~dusty~~ compound comprises Cr, the same granular transition metal ~~dusty~~ compound composition is used for various radioactive materials and the same granular transition metal ~~dusty~~ compound is used for a plurality of radioactive material deactivations.

44. (Cancelled)

45. (Previously Presented) The method 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  $\mu\text{m}$ .

46. (Previously Presented) The method according to claim 32, wherein the hydrogen is deprived of voluntary addition of deuterium and tritium.

47. (Cancelled)

48. (Currently Amended) The method according to claim 32, wherein the electric field is generated after heating the chamber at ~~said the~~ initial temperature, wherein the heating being is maintained during a first part of an electric field

generation period until the method becomes exothermic, the heating being stopped  
at the end of ~~said the~~ first part, and removing thermal energy from the chamber  
starting after ~~said the~~ first part.

49. (Previously Presented) The method according to claim 48, wherein the electric field 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) The method according to claim 50, comprising heating the dusty compound and the radioactive material.

52. (Cancelled)

### **REMARKS**

As an initial matter, Applicant and Attorney Hunter thank Examiner Wasil for their time during the telephonic interview. Applicant has submitted the amendments and arguments discussed during the interview herein, as Examiner Wasil indicated that they may be sufficient to overcome the present rejection, however, a further review would be necessary.

#### **Rejections under 35 USC §112(b)**

In the Office Action, claims 32-35, 38, 41, 42, 45, 46, 48 and 49 were rejected under 35 USC §112 as being indefinite. Without commenting on the propriety of the rejection, Applicant has amended claim 32 as discussed, namely, to replace “dusty compound” with “granular transition metal” and to remove the limitation regarding the source of emitted protons. Therefore, Applicant respectfully submits that the rejection in regards to claim 32 has been overcome, and respectfully requests withdrawal of the rejection.

Furthermore, the dependency of claims 35, 36, and 39 have been updated to claim 32 as suggested. Therefore, Applicant respectfully submits that the rejection has been overcome, and respectfully requests withdrawal of the rejection.

#### **Rejections under 35 USC §112(a) and Objection to the Specification**

In the Office Action, claims 32-35, 38, 40-42, 44-49, and 52 were rejected under 35 USC §112(a), and the specification was objected to, as assertedly lacking enablement or lacking scope of enablement. Initially, without commenting on the propriety of the rejection, as discussed during the interview, Applicant has clarified the claims to show that the heating is an initial temperature necessary to reach an exothermic process, and is not the final temperature that is used to carry out the

method. Therefore, Applicant respectfully submits that the Office Action's analysis of cold fusion is unrelated to the presently pending claims.

Furthermore, as discussed, Applicant has amended the claims to more closely follow the discussion contained in paragraphs [0129] – [0148] as well as examples 3 and 4 (which show successful transmutation of the granular transition metal and the radioactive material). Namely, Applicant has amended the claims to show that the hydrogen environment, the pressure, the electric field, and the energizing by heating of the granular transition metal and the radioactive material, all contribute to the transmutation of the granular transition metal and the radioactive material. Therefore, as these steps are clearly laid out such that one having skill in the art would understand the process, and as the process is shown to be repeatable and successful according to examples 3 and 4, Applicant respectfully submits that the presently pending claims and specification are clearly enabled.

Furthermore, Applicant notes that under MPEP 2164.04 “ A specification disclosure which contains *a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented* **must be taken as being in compliance with the enablement requirement...**” Therefore, as the specification clearly teaches a method of exothermic transmutation for at least partially deactivating radioactive material, and also provides multiple working examples of the taught method, Applicant respectfully submits that the present disclosure teaches a process in terms which correspond in scope to those used describing and defining the scope of the claims. Thus, Applicant respectfully submits that the specification and claims should be awarded the presumption of compliance as stated by the

MPEP, and further, that the present specification clearly describes, and is thus enabling of, the presently pending claims.

### **Rejections under 35 USC §101**

In the Office Action claims 32-35, 38, 40-42, 44-49, and 52 stand rejected under 35 USC §101 as assertedly being inoperative and therefore lacking utility. However, initially, Applicant respectfully submit that the rejection in regards to enablement has been fully addressed above, and has been overcome. Therefore, Applicant respectfully submits that the disclosure is clearly not inoperative as shown by the multiple examples, and thus, respectfully submits that the Office Action has failed to show or provide any rational underpinning for the assertion that the disclosure is inoperative. Thus, Applicant respectfully submits that the rejection has been overcome, and respectfully requests withdrawal of the rejection.

### **Conclusion**

Based on the remarks above, it is believed that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested. The Examiner is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this Response.

Please charge any additional fees required by this Amendment to Deposit Account No. 04-1403. Respectfully submitted,

DORITY & MANNING, P.A.

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Date

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