tion of hydrogen in the metal alloy material.

2. A method according to claim 1, characterized in that the absorption is carried out at temperatures up to about 300° C.

3. A method according to claim 2, characterized in that the absorption is carried out at temperatures of between about 50° and about 150° C.

4. A method according to claim 3, characterized in that a hydrogen and deuterium mixture is brought into contact, in stages, with said metal alloy material in dehydrogenated powder form to provide a non-absorbed residual gas having a constantly increasing deuterium content.

5. A method according to claim 3, characterized in that the hydrogen/deuterium mixture is passed in continuous circulation over a said metal alloy material in a dehydrogenated form.

6. A method acording to claim 3, characterized in that a gaseous mixture of hydrogen and deuterium is passed through a closed cycle operation to cause said mixture to come into contact with the metal alloy material.

7. A method according to claim 3, characterized in that a separating installation is filled with the metal alloy material in powder form.

8. A method according to claim 7, characterized in that the separating installation is completely filled with the metal alloy material in powder form.

9. A method according to claim 7, characterized in that the separating installation is partially filled with the metal alloy material in powder form.

10. A method according to claim 7, characterized in that the separating installation is a Clusius separating column.

11. A method according to claim 3, characterized in that a Clusius separating column of a material permeable to hydrogen is used and the inside thereof is covered with a compact layer of the metal alloy material.

12. A method according to claim 1, characterized in that a hydrogen and deuterium mixture is brought into contact, in stages, with dehydrogenated portions of said metal alloy material in powder form to provide a non-absorbed reesidual gas, the deuterium content of which increases from one stage to the other.

13. A method according to claim 1, characterized in that the hydrogen/deuterium mixture is passed in continuous circulation over a said metal alloy material in a dehydrogenated form.

14. A method according to claim 1, characterized in that a gaseous mixture of hydrogen and deuterium is passed through a closed cycle operation to cause said mixture to come into contact with the metal alloy material.

15. A method according to claim 1, characterized in that a separating installation is filled with the metal alloy material in powder form.

16. A method according to claim 15, characterized in that the separating installation is completely filled with the metal alloy material in powder form.

17. A method according to claim 15, characterized in that the separating installation is partially filled with the metal alloy material in powder form.

18. A method according to claim 15, characterized in that the separating installation is a Clusius separating column.

19. A method for separating deuterium and hydrogen, comprising the steps of bringing into contact a gaseous mixture of deuterium and hydrogen with a metal alloy material selected from the group consisting of TiNi, Ti_2Ni, and a mixture TiNi and Ti_2Ni in a Clusius separating column of a porous matrix whose pores are filled with the metal alloy material, thereafter separating a non-absorbed residual gas from the metal alloy material after a period of time sufficient for the absorption of hydrogen in the metal alloy material and conducting away hydrogen diffused through the column wall kept at temperatures up to about 300°C. maximum.

20. A method according to claim 19, characterized in that the column wall is kept at a temperature of about 50° to about 150° C.

21. A method according to claim 19, characterized in that the diffused hydrogen is continuously carried off.

22. A method according to claim 19, characterized in that the diffused hydrogen is intermittently carried away.

23. A method according to claim 1, characterized in that a Clusius separating column of a material permeable to hydrogen is used and the inside thereof is covered with a compact layer of the metal alloy material.

24. A process for producing deuterium-enriched gas, which comprises contacting a gaseous mixture of deuterium and hydrogen at temperatures up to about 300°C. with a metal alloy material consisting essentially of TiNi, Ti_2Ni or a mixture of TiNi and Ti_2Ni for a period of time sufficient to absorb hydrogen in said material and to provide a deuterium-enriched residue gas, separating said residue gas from said material, heating the material having hydrogen absorbed therein to cause dehydrogenation and discharge of hydrogen from said material, thereafter contacting said dehydrogenation material with said gaseous mixture of deuterium and hydrogen or said deuterium-enriched residue gas to absorb additional hydrogen and to provide another deuterium-enriched residue gas, and separating said another deuterium-enriched residue gas from said material.

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