CLAIMS:

1. A process for the thermal decomposition of ammonia, wherein the process comprises passing ammonia through a conduit which contains an ammonia decomposition catalyst in a part thereof, at least a section of the part of the conduit which contains the catalyst being immersed in molten lead as heat transfer medium which is at a temperature at which the catalyst is capable of catalyzing the decomposition of ammonia into hydrogen and nitrogen, and wherein the conduit comprises a substantially U-shaped tube and/or the conduit comprises a part which does not contain decomposition catalyst and through which ammonia to be decomposed is passed to heat it to a temperature which is suitable for contact with the decomposition catalyst.

2. The process of claim 1, wherein the molten lead is present in a vessel whose outer wall is at least in part in direct contact with a hot gas whose temperature is higher than the temperature at which the catalyst is capable of catalyzing the decomposition of ammonia.

3. The process of claim 2, wherein the hot gas is or comprises a combustion gas generated by the combustion of a gas or gas mixture which is or comprises hydrogen and/or ammonia.

4. The process of claim 3, wherein the gas mixture comprises hydrogen and nitrogen.

5. The process of claim 4, wherein at least a part of the gas mixture is the exhaust gas of the anode part of a hydrogen fuel cell which had been supplied with a gas mixture generated by the thermal decomposition of ammonia in the conduit.

6. The process of claim 4, wherein the gas or gas mixture is or comprises ammonia.

7. The process of any one of claims 2 to 6, wherein the hot gas is passed through a gap between at least a part of the outer wall of the molten lead containing vessel and an inner wall of a thermo-isolated external casing which completely surrounds at least a part of the molten-lead containing vessel.

8. The process of any one of claims 1 to 7, wherein the conduit comprises a substantially U-shaped tube.

9. The process of any one of claims 1 to 8, wherein a plurality of conduits is used.

10. The process of any one of claims 1 to 9, wherein the conduit comprises a part which does not contain decomposition catalyst and through which ammonia to be decomposed is passed to heat it to a temperature which is suitable for contact with the decomposition catalyst.

11. The process of claim 10, wherein at least a portion of the part of the conduit for heating the ammonia is in direct contact with hot gas generated by the combustion of a gas or gas mixture which is or comprises hydrogen and/or ammonia and had previously been in contact with the outer wall of a vessel which contains the molten lead.

12. The process of any one of claims 1 to 11, wherein the process further comprises passing the decomposition products in the conduit to the anode part of a hydrogen fuel cell.

13. The process of any one of claims 1 to 12, wherein the ammonia decomposition catalyst comprises one or more of Ru, Ni, Rh, Co, Ir, Fe, Pt, Cr, Pd or Cu.

14. The process of any one of claims 1 to 13, wherein the ammonia decomposition catalyst comprises one or both of Ru and Ni.

15. A reactor for the thermal composition of ammonia, wherein the reactor is suitable for carrying out the process of any one of claims 1 to 14 and comprises a device for generating a hot gas by combusting a hydrogen and/or ammonia containing gas or gas mixture, a vessel containing the molten lead and at least one conduit containing the ammonia decomposition catalyst in a part thereof, at least a section of the catalyst containing part of the conduit being surrounded by the molten lead present in the vessel, and a thermo-isolated external casing which completely surrounds at least a part of the molten lead-containing vessel such that there is a gap between an outer wall of the vessel and an inner wall of the external casing through which gap the hot gas can pass, and wherein the at least one conduit comprises a substantially U-shaped tube and/or the at least one conduit comprises a part which does not comprise catalyst and is capable of being heated by hot gas which had previously been in contact with the outer wall of the molten lead

containing vessel to thereby heat ammonia gas entering the conduit to a temperature suitable for contacting the decomposition catalyst.

16. The reactor of claim 15, wherein the at least one conduit comprises a substantially U-shaped tube.

17. The reactor of any one of claims 15 and 16, wherein a plurality of conduits is present.

18. The reactor of any one of claims 15 to 17, wherein the at least one conduit comprises a part which does not comprise catalyst and is capable of being heated by hot gas which had previously been in contact with the outer wall of the molten lead containing vessel to thereby heat ammonia gas entering the conduit to a temperature suitable for contacting the decomposition catalyst.

19. The reactor of any one of claims 15 to 18, wherein the reactor further comprises at least one heating element which is at least in part immersed in the molten lead and capable of melting the molten lead before the vessel is contacted with the hot gas.

20. The reactor of any one of claims 15 to 19, wherein the reactor further comprises a tank for holding liquid ammonia and a heating element which is capable of evaporating the ammonia.

21. The reactor of any one of claims 15 to 20, wherein an outlet of the reactor is connected to an inlet of the anode part of a hydrogen fuel cell.

22. The reactor of any one of claims 15 to 21, wherein a gas inlet of the burner of the reactor is connected to an exhaust gas outlet of the anode part of a hydrogen fuel cell.

23. A unit, wherein the unit comprises a hydrogen fuel cell and the reactor of any one of claims 15 to 22 connected to each other.