Claims

1. A process for the catalytic cracking of ammonia, the process comprising:

supplying an ammonia feed gas to one or more heated catalyst containing reaction vessels disposed within an ammonia cracking reactor; and

cracking the ammonia in the ammonia feed gas in the one or more catalyst containing reaction vessels to produce a hydrogen containing stream,

wherein the first alloy comprises nickel and/or cobalt in an amount greater than 11 wt% of the first alloy and is more resistant to nitriding than the second alloy, the second alloy comprises iron, nickel, and/or chromium and provides mechanical support to the first alloy, the or each reaction vessel is in the form of a reaction tube in which catalyst is disposed, the second alloy is in the form of a tube and the first alloy forms a coating or layer over at least a portion of the interior surface of the tube and wherein at least a portion of the wall adjacent the catalyst is composed of the first alloy.

2. A process according to claim 1, wherein the second alloy has a higher creep strength and/or mechanical stability than the first alloy.

3. A process according to any preceding claim, wherein the first alloy is provided in at least a region of the or each reaction vessel where nitriding potential is highest.

4. A process according to any preceding claim, wherein the first alloy is provided in at least a region of the or each reaction vessel closer to an inlet of the reaction vessel than an outlet of the reaction vessel with respect to gas flow.

5. A process according to any preceding claim, wherein at least 50%, 60%, 70%, 80%, 90% or all of the surface of the or each reactor vessel adjacent the catalyst is formed of the first alloy.

6. A process according to any preceding claim, wherein the or each reaction vessel comprises a lower wt% of the first alloy compared to the wt% of the second alloy.

7. A process according to any preceding claim, wherein the first and second alloys are provided as layers of the or each reactor vessel wall with the first alloy layer having a thickness which is less than the second alloy layer.

8. A process according to any preceding claim, wherein the first alloy has an oxide layer disposed on the surface thereof.

9. A process according to any preceding claim, wherein an intermediate adhesion layer is provided between the first and second alloys.

10. A process according to any preceding claim, wherein the first alloy comprises nickel and/or cobalt in an amount greater than 15 wt%, 20 wt%,30 wt%, 50 wt%,or 75 wt%, of the first alloy.

11. A process according to any preceding claim, wherein the first alloy comprises nickel and/or cobalt in a wt% amount which is greater than in the second alloy.

12. A process according to any preceding claim, wherein the first alloy comprises one or more of Cr, Si or Al.

13. A process according to any preceding claim, wherein the second alloy comprises at least 10 wt%, 15 wt%, 20%, or 30% chromium.

14. A reaction vessel for use in the process according to any preceding claim, wherein the reaction vessel comprises an ammonia cracking catalyst and has a wall which is composed of at least a first alloy and a second alloy, wherein the first alloy comprises nickel and/or cobalt in an amount greater than 11 wt% of the first alloy and is more resistant to nitriding than the second alloy and the second alloy comprises iron, nickel, and/or chromium and provides mechanical support to the first alloy, the or each reaction vessel is in the form of a reaction tube in which catalyst is disposed, the second alloy is in the form of a tube and the first alloy forms a coating or layer over at least a portion of the interior surface of the tube, and wherein at least a portion of the wall adjacent the catalyst is composed of the first alloy.

15. An ammonia cracking reactor comprising one or more reaction vessels according to claim 14.