CLAIMS:

1. A seal assembly for a wellhead assembly, comprising:

a metal seal structural body having at least one surface area adapted to form a seal against an opposing surface; and

a metal layer disposed over at least one of the metal seal structural body or the opposing seal structure to form a metal-to-metal seal, wherein the metal layer comprises tantalum.

2. The seal assembly as recited in claim 1, wherein the metal seal structural body comprises a corrosion-resistant alloy (CRA).

3. The seal assembly as recited in claim 2, wherein the CRA is a nonferrous-based alloy in which any one or the sum of the specified amount of the elements titanium, nickel, cobalt, chromium, and molybdenum exceeds 50% (mass fraction).

4. A seal assembly for a wellhead assembly, comprising:

a metal seal structural body having at least one surface area adapted to form a seal against an opposing surface, wherein the metal body comprises a first corrosion-resistant alloy; and

a metal layer disposed over at least one of the at least one surface area adapted to form a seal against an opposing surface or the opposing surface, wherein the metal layer comprises a second corrosion-resistant alloy, the second corrosion-resistant alloy having a greater ductility than the first corrosion-resistant alloy.

5. The seal assembly as recited in claim 4, wherein the second corrosion-resistant alloy comprises a refractory metal.

6. The seal assembly as recited in claim 5, wherein the first corrosion-resistant alloy is a nonferrous-based alloy in which any one or the sum of the specified amount of the elements titanium, nickel, cobalt, chromium, and molybdenum exceeds 50% (mass fraction).

7. A method of manufacturing a seal, comprising:

machining a metal to form a base seal structure having at least one surface configured to form a seal against an opposing surface; and

disposing a layer comprising tantalum over at least one of the at least one surface configured to form a seal against an opposing surface of the base seal structure or the opposing surface.

8. The method as recited in claim 7, wherein machining a metal to form a base seal structure having at least one surface configured to form a seal against an opposing surface comprises machining a corrosion-resistant alloy to form a base seal structure having at least one surface configured to form a seal against an opposing surface.

9. A method of manufacturing a seal, comprising:

machining a first corrosion-resistant alloy to form a base seal structure having at least one surface configured to form a seal against an opposing surface; and

disposing a layer of a second corrosion-resistant alloy having a greater ductility than the first corrosion-resistant alloy on at least one of the at least one surface configured to form a seal against an opposing surface of the base seal structure or the opposing surface.

10. The method of manufacturing a seal as recited in claim 9, wherein machining a first corrosion-resistant alloy to form a base seal structure having at least one surface configured to form a seal against an opposing surface comprises machining a nickel or cobalt-based alloy to form a base seal structure having at least one surface configured to form a seal against an opposing surface.

CLAIMS:

1. A seal assembly for a wellhead assembly, the seal assembly comprising:

a metal seal structural body comprising a corrosion-resistant alloy (CRA) having at least one seal surface area adapted to form a seal against an opposing surface of the wellhead assembly; and

a metal layer disposed directly on at least one of the seal surface areas to form a metal-to-metal seal, wherein the metal layer comprises tantalum.

2. The seal assembly as recited in claim 1, wherein the metal layer comprises an alloy corresponding to UNS (Unified Numbering System) R05200.

3. The seal assembly as recited in claim 1, wherein the metal layer comprises an alloy corresponding to UNS (Unified Numbering System) R05210.

4. The seal assembly as recited in claim 1, wherein the CRA is an alloy intended to be resistant to general and localized corrosion of oilfield environments that are corrosive to carbon steels.

5. The seal assembly as recited in any preceding claim, wherein the CRA is a nonferrous-based alloy in which any one or the sum of the specified amount of the elements titanium, nickel, cobalt, chromium, and molybdenum exceeds 50% (mass fraction).

6. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises a precipitation-hardened nickel-based alloy.

7. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises an alloy corresponding to UNS (Unified Numbering System) alloy N07718.

8. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises an alloy corresponding to UNS (Unified Numbering System) alloy N07725.

9. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises an alloy corresponding to UNS (Unified Numbering System) alloy N07716.

10. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises an alloy corresponding to UNS (Unified Numbering System) alloy N09925.

11. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises a precipitation-hardened cobalt-based alloy.

12. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises an alloy corresponding to UNS (Unified Numbering System) alloy R31233.

13. The seal assembly as recited in any one of the preceding claims, wherein the metal seal structural body comprises an alloy corresponding to UNS (Unified Numbering System) alloy R30006.

14. The seal assembly as recited in any one of the preceding claims,

wherein the metal body comprises a first corrosion-resistant alloy; and

wherein the metal layer comprises a second corrosion-resistant alloy, the second corrosion-resistant alloy having a greater ductility than the first corrosion-resistant alloy.

15. The seal assembly as recited in claim 14, wherein the second corrosion-resistant alloy comprises a refractory metal.

16. The seal assembly as recited in claim 15, wherein the second corrosion-resistant alloy comprises tantalum.

17. A method of manufacturing a seal, the method comprising:

machining a metal comprising a corrosion-resistant alloy (CRA) to form a base seal structure having at least one surface configured to form a seal against an opposing surface of the wellhead assembly; and

disposing a layer comprising tantalum directly on the at least one surface configured to form a seal against an opposing surface of the base seal structure or the opposing surface.

18. The method of claim 17, wherein:

the layer comprising tantalum has a greater ductility than the corrosion-resistant alloy of the base seal structure or the opposing surface.

19. A seal assembly for a wellhead assembly substantially as hereinbefore described with reference to the accompanying drawings.

20. A method substantially as hereinbefore described with reference to the accompanying drawings.