CLAIMS

What is claimed is:

1. A composition for etching a cobalt chromium alloy, the composition comprising:
hydrochloric acid (HCl), 0.05N – 0.8N nitric acid (HNO_3), and hydrofluoric acid (HF);
and
component metals of the cobalt chromium alloy, the component metals comprising at least 3g/l chromium (Cr), and at least 0.5 g/l molybdenum (Mo),
wherein the composition etches cobalt chromium alloys at a rate of 0.1 to 1.0 mil/minute.

2. The composition of Claim 1, comprising:
0.6N – 1.3N hydrofluoric acid (HF).

3. The composition of Claim 1, wherein the component metals comprise:
3 – 10 g/l Chromium (Cr); and
0.5 – 5 g/l molybdenum (Mo).

4. The composition of Claim 3, further comprising:
50 – 225 g/l Iron (Fe).

5. The composition of Claim 1, wherein the component metals comprise at least 1g/l cobalt (Co).

6. The composition of Claim 5, comprising:
7 – 355 g/l cobalt (Co);
3 – 170 g/l chromium (Cr); and
1 – 40 g/l molybdenum (Mo).

7. The composition of Claim 1, comprising:
at least 2N hydrochloric acid (HCl);
0.05N – 0.8N nitric acid (HNO_3);
0.6N – 1.3N hydrofluoric acid (HF);

50 – 225 g/l Iron (Fe);
1 – 10 g/l chromium (Cr); and
0.1 – 5 g/l molybdenum (Mo).

8. The composition of Claim 1, comprising:
at least 2N hydrochloric acid (HCl);
0.05N – 0.8N nitric acid (HNO_3);
0.6N – 1.3N hydrofluoric acid (HF);
7 – 355 g/l cobalt (Co);
3 – 170 g/l chromium (Cr); and
1 – 40 g/l molybdenum (Mo).

9. A method for etching a cobalt chromium alloy work-piece, the method comprising:
contacting at least one surface of the work-piece with the chemical etching composition of Claim 1,
wherein the contacting step is carried out at a temperature of 20°C to 100°C for a time period of 1 minute to 200 minutes, and
wherein the composition etches a surface of the cobalt chromium alloy work-piece at a rate of 0.1 to 1.0 mil/minute.

10. The method of Claim 9, wherein the chemical etch composition comprises:
0.6N – 1.3N hydrofluoric acid (HF).

11. The method of Claim 10, wherein the component metals comprise:
3 – 10 g/l Chromium (Cr); and
0.5– 5 g/l molybdenum (Mo).

12. The method of Claim 11, further comprising:
50 – 225 g/l Iron (Fe).

13. The method of Claim 10, wherein the component metals comprise at least 1g/l cobalt (Co).

14. The method of Claim 13, wherein the component metals comprise:
7 – 355 g/l cobalt (Co);
3 – 170 g/l chromium (Cr); and
1 – 40 g/l molybdenum (Mo).

15. The method of Claim 9, further comprising, before the step of contacting the work-piece with the chemical etching composition:
activating the at least one surface of the work-piece with an activation solution comprising a 10% to 100% (v/v) aqueous solution of a mineral acid.

16. The method of Claim 15, wherein the contacting step is carried out within 120 seconds of the activating step.

17. The method of Claim 9, wherein, before the contacting step, the method comprises:
applying a coating which resists chemical etchants to the work-piece; and
removing a portion of the coating to form a patterned design in the coating on the work-piece.

18. The method of Claim 17, wherein, after the contacting step, the method comprises:
stripping the coating from the work-piece.

19. A composition for etching a cobalt chromium alloy, the composition comprising:
hydrochloric acid (HCl), nitric acid (HNO_3), and 0.6N – 1.3N hydrofluoric acid (HF); and
component metals of the cobalt chromium alloy, the component metals comprising at least 3g/l chromium (Cr), and at least 0.5 g/l molybdenum (Mo).

20. The composition of Claim 19, comprising:
0.05N – 0.8N nitric acid (HNO_3).