Claim

1. An apparatus for regenerating an etchant and recovering a metal from the etchant, the apparatus comprising:

an electrolytic cell comprising,

a first compartment and a second compartment separated from the first compartment via a permeable divider, wherein the second compartment is in fluid communication with the first compartment through the divider, wherein the permeable divider is adapted to allow the etchant to flow therethrough from the first compartment to the second compartment or vice versa, wherein each of the first compartment and the second compartment are adapted to contain the etchant having an etchant level, wherein, when the apparatus is in operation, the etchant level in the first compartment is maintained at a higher or lower level than the etchant level in the second compartment, wherein the etchant flows from the compartment with the higher etchant level to the compartment with the lower etchant level,

a cathode and an anode disposed in the first compartment and the second compartment respectively, wherein the cathode and the anode are electrically connectable to a first electrical source and the anode is inert to the etchant, and

a stripping tank adapted to contain a substrate having a metal coating and the etchant adapted to remove the metal coating from the substrate, wherein the stripping tank is in fluid communication with the first compartment and the second compartment, wherein the stripping tank is adapted to channel the etchant to the first compartment and second compartment and is adapted to receive the etchant from the second compartment.

2. The apparatus of claim 1, wherein the permeable divider comprises a buffer compartment having a first permeable wall and a second permeable wall opposite the first permeable wall, wherein the buffer compartment is in fluid communication with the first compartment via the first permeable wall and is in fluid communication with the second compartment via the second permeable wall, wherein the buffer compartment is in fluid communication with the stripping tank, wherein the buffer compartment is adapted to receive the etchant from the stripping tank so as to channel the etchant to the first compartment and second compartment, and wherein the buffer compartment contains the etchant having an

etchant level wherein the etchant level is maintained at a higher level than the etchant levels of the first compartment and the second compartment.

3. The apparatus of claim 1 or 2, wherein the electrolytic cell is disposed at a higher elevation than the stripping tank, wherein the etchant in the second compartment, when overflows, flows into the stripping tank.

4. The apparatus of any one of claims 1 to 3, wherein the apparatus further comprises a supplementary electrolytic cell fluidly connected to the electrolytic cell, the supplementary electrolytic cell comprising,

a proximal compartment and a distal compartment separated from the proximal compartment via a permeable divider, wherein the proximal compartment is in fluid communication with the distal compartment through the permeable divider,

a supplementary cathode and a supplementary anode disposed in the proximal compartment and the distal compartment respectively, wherein the supplementary cathode and the supplementary anode are connected to a second electrical source,

wherein the proximal compartment is in fluid communication with the first compartment and the distal compartment is in fluid communication with the second compartment and the stripping tank, wherein the proximal compartment is adapted to receive the etchant from the first compartment and adapted to channel the etchant to the first compartment, and the distal compartment is adapted to receive the etchant from the second compartment and adapted to channel the etchant to the stripping tank.

5. The apparatus of claim 4, wherein the electrolytic cell is disposed at a higher elevation than the supplementary electrolytic cell and the supplementary electrolytic cell is disposed at a higher elevation than the stripping tank, wherein the etchant of the second compartment, when overflows, flows into the distal compartment and the etchant of the distal compartment, when overflows, flows into the stripping tank.

6. The apparatus of claim 4 or 5, wherein the proximal compartment and the distal compartment, each compartment comprises the etchant having an etchant level, wherein the etchant level of the proximal compartment is higher or lower than the etchant level of the distal compartment.

7. The apparatus of any one of claims 4 to 6, wherein the first electrical source is adapted to generate a first magnitude of current and the second electrical source is adapted to generate a second magnitude of current, wherein the first magnitude of current is higher or lower than the second magnitude of current.

8. The apparatus of any one of claims 1 to 7, wherein the anode and/or supplementary anode comprise an inert material which does not react with the etchant.

9. The apparatus of any one of claims 1 to 8, wherein the permeable divider is made from a hydrophobic material.

10. The apparatus of claim 9, wherein the permeable divider is charged.

11. A method for regenerating an etchant and recovering a metal from the etchant using the apparatus of any one of claims 1 to 10, the method comprising:

channelling the etchant from the stripping tank into the first compartment and the second compartment of the electrolytic cell, the first compartment and the second compartment separated via the permeable divider adapted to allow flow from the first compartment to the second compartment or vice versa via the permeable divider,

maintaining the etchant level in the first compartment at a higher or lower level than the etchant level in the second compartment when the apparatus is in operation, wherein the etchant flows from the compartment with the higher etchant level to the compartment with the lower etchant level, and

channelling the etchant from the second compartment of the electrolytic cell into the stripping tank.

12. The method of claim 11, wherein the method further comprises channelling the etchant from the stripping tank into the buffer compartment so as to channel the etchant into the first compartment and the second compartment and maintaining the etchant level of the buffer compartment to be at a higher level than the etchant levels of the first compartment and the second compartment.

13. The method of claim 11 or 12, wherein channelling from the second compartment into the stripping tank includes overflowing the etchant from the second compartment into the stripping tank.

14. The method of any one of claims 11 to 13, wherein the method further comprises channelling the etchant from the first compartment into the proximal compartment, channelling the etchant from the second compartment into the distal compartment, channelling the etchant from proximal compartment to the first compartment, and channelling the etchant from the distal compartment into the stripping tank.

15. The method of claim 14, wherein the channelling the etchant from the second compartment to the distal compartment includes overflowing the etchant from the second compartment to the distal compartment and wherein channelling the etchant from the distal compartment to the stripping tank includes overflowing the etchant from the second compartment to the distal compartment.

16. The method of claim 14 or 15, wherein the method further comprises maintaining the etchant level of the proximal compartment at a higher or lower level than that of the distal compartment.

17. The method of any one of claims 11 to 16, wherein the method further comprises varying the first magnitude of current to be higher or lower than the second magnitude of current.