CLAIMS

1. A method of treating a liquid waste containing target species, comprising the steps of exposing the liquid to a catalyst to remove either a reducing agent or an oxidising agent from the liquid, subsequently conveying the liquid to a reverse osmosis or nanofiltration membrane to obtain a retentate rich in the target species and a permeate lean in the target species, and returning the retentate to the liquid upstream from the membrane.

2. A method according to Claim 1, wherein an oxidising agent is removed by the catalyst.

3. A method according to Claim 2, wherein hydrogen peroxide is removed by the catalyst.

4. A method according to Claim 3, wherein hydrogen peroxide is converted into oxygen (O_2) and water (H_2O) by the catalyst.

5. A method according to Claim 4, wherein the catalyst is purged with a purge gas, such as nitrogen.

6. A method according to any preceding claim, wherein the catalyst comprises alumina loaded with platinum.

7. A method according to any preceding claim, wherein the liquid contains sulphuric acid, and the permeate is rich in sulphuric acid.

8. A method according to any preceding claim, wherein the target species comprise at least one metal.

9. A method according to any preceding claim, wherein the liquid is a waste stream from a copper plating process, and wherein the target species comprise divalent copper ions.

10. A method according to Claim 1, wherein a reducing agent is removed from the liquid by the catalyst.

11. A method according to Claim 10, wherein an aminoborane is removed from the liquid by the catalyst.

12. A method according to Claim 11, wherein dimethylamine borane (DMAB) is converted into hydrogen (H_2), boric acid and dimethylamine by the catalyst.

13. A method according to Claim 10, wherein hypophosphite ions are removed from the liquid by the catalyst.

14. A method according to Claim 12, wherein hypophosphite ions are converted into hydrogen (H_2), and phosphite ions by the catalyst.

15. A method according to any of Claims 11 to 14, wherein the catalyst is purged with a purge gas, such as nitrogen.

16. A method according to any of Claims 10 to 15, wherein the target species comprise at least one metal.

17. A method according to any of Claims 10 to 16, wherein the liquid is a waste stream from a cobalt plating process, and wherein the metallic cations comprise cobalt ions.

18. A method according to any of Claims 10 to 17, wherein the catalyst comprises alumina loaded with palladium.

19. A method of treating a liquid waste containing target species, comprising the steps of conveying the liquid to a reverse osmosis or nanofiltration membrane to obtain a retentate rich in target species and a permeate lean in target species, and characterised by, upstream from the membrane, exposing the liquid to a catalyst to remove an oxidising agent from the liquid to inhibit damage to the membrane.

20. A method of treating a liquid waste discharged from a tool and containing target species, comprising the steps of conveying the liquid to a reverse osmosis or nanofiltration membrane to obtain a retentate rich in target species and a permeate lean in target species, and characterised by, upstream from the membrane, conveying the liquid through a housing mounted on or positioned adjacent to the tool and containing a catalyst for removing a reducing agent from the liquid.

CLAIMS

1. A method of treating a liquid waste containing target species, comprising exposing the liquid to a catalyst in a housing to remove either a reducing agent or an oxidizing agent from the liquid, subsequently conveying the liquid to a reverse osmosis or nanofiltration membrane to obtain a retentate rich in the target species and a permeate lean in the target species, returning the retentate to the liquid upstream from the membrane, and purging [a] the housing containing the catalyst with a nitrogen purge gas to remove gaseous by products formed from converting the reducing agent or oxidising agent by the catalyst.

2. A method according to Claim 1, wherein an oxidising agent is removed by the catalyst.

3. A method according to Claim 2, wherein hydrogen, peroxide is removed by the catalyst.

4. A method according to Claim 3, wherein hydrogen peroxide is converted into oxygen (O_2) and water (H_2O) by the catalyst.

5. A method according to any preceding claim, wherein the liquid is a waste stream from a copper plating process, and wherein the target species comprise divalent copper ions.

6. A method according to Claim 1, wherein a reducing agent is removed from the liquid by the catalyst.

7. A method according to Claim 6, wherein an aminoborane is removed from the liquid by the catalyst.

8. A method according to Claim 7, wherein dimethylamine borane (DMAB) is converted into hydrogen (H_2), boric acid and dimethylamine by the catalyst.

9. A method according to Claim 6, wherein hypophosphite ions are removed from the liquid by the catalyst.

10. A method according to Claim 8, wherein hypophosphite ions are converted into hydrogen (H_2), and phosphite ions by the catalyst.

11. A method according to any of Claims 1 or 6 to 10, wherein the target species comprise at least one metal.

12. A method according to any of Claims 6 to 11, wherein the liquid is a waste stream from a cobalt plating process, and wherein the metallic cations comprise cobalt ions.

13. A method according to any of Claims 1 to 4 or 6 to 12, wherein the catalyst comprises alumina loaded with either platinum or palladium.