CLAIMS

1. A permeation process comprising:

effecting fractionation of a gaseous mixture via a membrane such that a permeate and a retentate are obtained, wherein the membrane includes:

a polymeric matrix co-operating with liquid material to define a liquid material-comprising gel; and

a carrier material for facilitating permeation through the membrane;

wherein:

the carrier material is dissolved within the liquid material;

the carrier material includes at least one metal cation; and

the at least one metal cation is disposed throughout the polymeric matrix via chelation to, or complexing with, the polymeric matrix;

and

replenishing the liquid material within the membrane, in response to depletion of the liquid material effected during the fractionation, wherein the replenishing includes contacting the membrane with a replenishing liquid material including dissolved carrier material.

2. The process as claimed in claim 1;
wherein the membrane includes a polysaccharide.

3. The process as claimed in claim 1;
wherein the membrane includes chitosan.

4. The process as claimed in any one of claims 1 to 3;
wherein the gaseous material is a mixture including an olefin and a paraffin.

5. The process as claimed in any one of claims 1 to 4;
wherein the carrier material includes silver ion.

6. The process as claimed in any one of claims 1 to 5;
Wherein the carrier material includes copper ion.

7. The process as claimed in any one of claims 1 to 6;
wherein:

the fractionation is effected in response to contacting of the gaseous material with the membrane;

the contacting is effected in response to supplying of the gaseous material to the membrane; and

the replenishing includes replenishing effected while the supplying is being effected.

8. The process as claimed in any one of claims 1 to 7;
wherein:

the fractionation is effected in response to contacting of the gaseous material with the membrane; and

the contacting is effected in response to supplying of the gaseous material to the membrane;

and further comprising:

prior to the replenishing, suspending the supplying, such that the replenishing includes replenishing effected while the supplying is suspended.

9. The process as claimed in any one of claims 1 to 8;
wherein the liquid material includes water.

10. The Process as claimed in any one of claims 1 to 8;
wherein the liquid material is water.

11. The process as claim in claim 10; wherein:
The replenishing liquid material is an aqueous solution.

12. The process as claimed in claim 8;

Wherein the suspending of the supplying of the gaseous material to the membrane is with effect that a first fractionation time interval is completed, such that the replenish is effected while the supplying is effected, is effected after the first fractionation time interval; and further comprising:

suspending the effecting of the contacting of the membrane with a replenishment liquid material such that a first liquid replenishment time interval is completed;

after the completion of the first liquid replenishment time interval; , effecting resumption of the supplying of the membrane such that a second fractionation time interval is completed;

suspending the resumed supplying of the gaseous supply material; and

after the completion of the second fractionation time interval, effecting resumption of the replenishing during a second liquid replenishment time interval,

wherein the minimum concentration of dissolved carrier material within the replenishment liquid material being supplied during one of the first and second liquid replenishment time intervals is greater than the maximum concentration of dissolved carrier material within the replenishment liquid material being supplied during the other one of the first and second liquid replenishment time intervals.

13. The process as claimed in claim 12;

wherein the liquid material includes water.

14. The process as claimed in claim 12;

wherein the liquid material is water.

15. The process as claimed in claim 13 or 14;

wherein the replenishment liquid material is an aqueous solution.

16. The process as claimed in any one of claims 1 to 15;

wherein the replenishing is effected in response to sensing that at least a fraction of the liquid material becomes depleted from the membrane.

17. The process as claimed in any one of claims 1 to 16;

as effected within a membrane module, wherein the supplying of the replenishment liquid material for the effecting of the contacting of the membrane with a replenishment liquid material, is effected by flowing the replenishment liquid material in an upwardly direction.

18. The process as claimed in any one of claims 1 to 17;

wherein the replenishing includes flowing the replenishment liquid material through the membrane and into a space whose pressure is below atmospheric pressure.

19. The process as claimed in any one of claims 1 to 18;

wherein the membrane includes a polysaccharide, and the replenishment liquid material includes an aqueous solution of silver ion having a molar concentration of at least 1.0.

20. The process as claimed in any one of claims 1 to 19;

wherein the replenishment liquid material includes between 10 and 90 weight% water, based on the total weight of the replenishment liquid material.