What is claimed is:

1. A liquid cooling generator comprising:

a housing having an inflow portion for receiving a source liquid solution,

a treatment portion for treating the source liquid solution, wherein the treatment portion comprises a molybdenum-containing structure, wherein the molybdenum- containing structure is made of a corrosion-resistant alloy including molybdenum, wherein the molybdenum-containing structure is machined or polished to remove scale from a casting process, and

an outflow portion for releasing a treated liquid solution

wherein the treatment portion comprises at least two contact surface planes separated by cavitation spaces,

wherein an endothermic electrochemical oxidative reaction occurs when the source liquid comes into contact with the molybdenum-containing structure which results in cooling of the liquid solution.

2. The liquid cooling generator of claim 1, wherein the molybdenum-containing structure comprises at least two disc-like elements are mounted on a shaft extending axially through the housing, the disc-like elements being separated by a distance, each disc-like element having a first wall facing the inflow portion, a second wall facing the outflow portion and a peripheral wall extending between the first and second walls, the disc-like elements being mounted on a shaft, wherein the disc-like element comprises any geometric shape, wherein the distance between the disc-like elements provides for a cavitation space, wherein the contact surface plane forms a surface on the disc-like elements which is machined or polished to remove scale from the casting process.

3. The liquid cooling generator of claim 2, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. % molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.

4. The liquid cooling generator of claim 3, wherein the metal alloy of the disc-like elements further comprise about 5.0 wt. % or more nickel, about 10.0 wt. % or more nickel, about 15.0 wt. % or more nickel, about 20.0 wt. % or more nickel, about 25.0 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.

5. The liquid cooling generator of claim 4, wherein the metal alloy is 316L stainless steel, 317L stainless steel or 904L stainless steel.

6. The liquid cooling generator according to any one of claims 1-5, wherein the disc-like elements include milling scale from the casting process, wherein 100% of the milling scale comprising dielectric contaminants being removed from the surface of the disc-like elements.

7. The liquid cooling generator according to any one of claims 1-6, wherein the disc-like elements are machined or polished with a non-ionic sanding grit which contains no metal contaminants.

8. The liquid cooling generator according to any one of claims 1-7, wherein the at least one edge within the disc-like elements is water jet cut.

9. The liquid cooling generator according to any one of claims 1-8, wherein the liquid cooling generator includes between 2 and 30 disc-like elements.

10. A molybdenum-activated liquid solution generation system comprising:

(c) at least one liquid cooling generator, each liquid cooling generator comprising an inflow portion for receiving a source liquid solution, a treatment portion for treating the source liquid solution, and an outflow portion for releasing a cooled molybdenum-activated treated liquid solution, wherein the treatment portion comprises at least two sequential shear planes separated by cavitation spaces wherein the shear planes are made of a corrosion-resistant alloy containing molybdenum, wherein the shear planes are machined or polished to remove scale from a casting process; and

(d) a source of the liquid solution in liquid communication with the inflow portion of the liquid cooling generator.

11. The molybdenum-activated liquid solution generation system of claim 10, wherein the liquid cooling generator comprises at least two disc-like elements mounted on a shaft extending axially through the housing, the disc-like elements being separated by a distance and containing the shear planes, each disc-like element having a first wall facing the inflow portion, a second wall facing the outflow portion and a peripheral wall extending between the first and second walls, the disc-like elements being mounted on a shaft, wherein the disc-like element comprises any geometric shape and wherein the distance between the disc-like elements provides for a cavitation space, wherein the shear plane forms a surface on the disc-like elements which is machined or polished to remove scale from the casting process.

12. The molybdenum-activated liquid solution generation system of claim 11, wherein the system comprises one or more of the following components: a source liquid pretreatment system, a high zeta potential crystal generator, a pre-filtration system, at least one filtration device or any combination thereof.

13. The molybdenum-activated liquid solution generation system of claim 12, wherein the liquid cooling generator and the source of the liquid are in liquid communication.

14. The molybdenum-activated liquid cooling generation system of claim 13, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from

about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. % molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.

15. The molybdenum-activated liquid cooling generation system according to claim 14, wherein the metal alloy of the disc-like elements further comprise about 5.0 wt. % or more nickel, about 10.0 wt. % or more nickel, about 15.0 wt. % or more nickel, about 20.0 wt. % or more nickel, about 25.0 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.

16. The molybdenum-activated liquid cooling generation system according to claim 15, wherein the metal alloy is 316L stainless steel, 317L stainless steel or 904L stainless steel.

17. The molybdenum-activated liquid cooling generation system according to any one of claims 10-16, wherein the disc-like elements include milling scale from the casting process, wherein 100% of the milling scale comprising dielectric contaminants being removed from the surface of the disc-like elements.

18. The molybdenum-activated liquid cooling generation system according to any one of claims 10-17, wherein the disc-like elements are machined or polished with a non-ionic sanding grit which contains no metal contaminants.

19. The molybdenum-activated liquid cooling generation system according to any one of claims 10-18, wherein the at least one edge within the disc-like elements is water jet cut.

20. The molybdenum-activated liquid cooling generation system according to any one of claims 1-19, wherein the liquid cooling generator includes between 2 and 30 disc-like elements.

21. A method of producing a molybdenum-activated liquid solution comprising:

(c) providing a liquid cooling generator comprising an inflow portion for receiving a source liquid solution, a treatment portion for treating the source liquid solution, and an outflow portion for releasing a cooled molybdenum-activated liquid solution, wherein the treatment portion comprises at least two sequential shear planes separated by cavitation spaces a treatment portion for treating the source liquid solution, wherein the shear planes are made of a corrosion-resistant alloy containing molybdenum, wherein the shear planes are machined or polished to remove scale from a casting process; and

(d) passing the source liquid solution through the liquid cooling generator, thereby producing a treated liquid solution that is molybdenum-activated and cooled.

22. The method of claim 21, wherein the treatment portion comprises at least two disc-like elements mounted on a shaft extending axially through the housing, the disc-like

elements being separated by a distance, each disc-like element having a first wall facing the inflow portion, a second wall facing the outflow portion and a peripheral wall extending between the first and second walls, the disc-like elements being mounted on a shaft, wherein the disc-like element comprises any geometric shape, wherein the distance between the disc-like elements provides for a cavitation space and wherein the shear plane forms a surface on the disc-like elements which is machined or polished to remove scale from the casting process.

23. The method of claim 22, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. % molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.

24. The method of claim 23, wherein the metal alloy of the disc-like elements further comprise about 5 wt. % or more nickel, about 10 wt. % or more nickel, about 15 wt. % or more nickel, about 20 wt. % or more nickel, about 25 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.

25. The method of claim 24, wherein the metal alloy is 316L stainless steel, 317L stainless steel or 904L stainless steel.

26. The method according to any one of claims 21-25, wherein the disc-like elements include milling scale from the casting process, wherein 100% of the milling scale comprising dielectric contaminants being removed from the surface of the disc-like elements.

27. The method according to any one of claims 21-26, wherein the disc-like elements are machined or polished with a non-ionic sanding grit which contains no metal contaminants.

28. The method according to any one of claims 21-27, wherein the at least one edge within the disc-like elements is water jet cut.

29. The method according to any one of claims 21-27, wherein the liquid cooling generator includes between 2 and 30 disc-like elements.

30. A method of making a liquid cooling generator comprising:

providing a series of two or more disc-like elements, wherein the disc-like elements comprise a metal alloy comprising molybdenum, wherein the disc-like elements comprise any geometric shape;

machining or polishing the disc-like elements to remove scale from the casting process;

water jet cutting the disc-like elements to form at least one razor sharp edge within the disc-like elements;

mounting the series two or more disc-like elements on a shaft, wherein the disc-like elements being separated by a distance, wherein the distance between the disc-like elements provides for a cavitation space;

providing a chamber; and

inserting the series of two or more sequential disc-like mounted on the shaft within the chamber so that the disc-like elements extend axially through the chamber.

31. The method according to claim 30, comprising:

fitting the series of two or more sequential disc-like elements mounted on the shaft within the chamber within a housing having an inflow portion for receiving one or more untreated liquids, a treatment portion containing the chamber for treating the one or more untreated liquid, and an outflow portion for releasing the treated one or more liquids, wherein each disc-like element has a first wall facing the inflow portion, a second wall facing the outflow portion and a peripheral wall extending between the first and second wall.

32. The method according to claim 30 or claim 31, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. % molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.

33. The method according to claim 32, wherein the metal alloy of the disc-like elements comprise about 5 wt. % or more nickel, about 10 wt. % or more nickel, about 15 wt. % or more nickel, about 20 wt. % or more nickel, about 25 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.

34. The method according to claim 33, wherein the metal alloy of the disc-like elements comprise 316L stainless steel, 317L stainless steel or 904L stainless steel.

35. The method according to any one of claims 30-34, wherein the step of machining or polishing the disc-like elements to remove scale from the casting process comprises removing 100% of the milling scale comprising dielectric contaminants from the surface of the disc-like elements.

36. The method according to any one of claims 30-35, wherein the step of machining or polishing the disc-like elements to remove scale from the casting process comprises using a non-ionic sanding grit which contains no metal contaminants.

37. The method according to any one of claims 30-36, wherein the step of machining or polishing the disc-like elements to remove scale from the casting process is completed to a Number 4 Grade.

38. The method according to any one of claims 30-37, wherein the water jet cutting of the disc-like elements is completed using a Number 5 Grade water jet cut.

39. The method according to any one of claims 30-38, wherein the surface of the disc-like elements are covered in plastic while being water jet cut.

40. The method according to any one of claims 30-39, wherein there is no heat applied to the surface of disc-like elements.

41. A reverse flow apparatus comprising:

a chamber having a series of two or more sequential disc-like elements mounted on a shaft extending axially through the chamber, the disc-like elements being separated by a space, each disc-like elements comprising a surface, at least one edge, a circumference and one or more S-shaped members extending from a point in the circumference to another point in the circumference and across a center of the disc-like element, the two or more sequential disc-like elements being mounted along the shaft in a twist arrangement such that at least one disc-like element in the apparatus has its S-shaped member in a forward-facing position and at least one disc-like element in the apparatus has its S-shaped member in a reverse-facing position,

wherein the disc-like elements comprise a metal alloy comprising at least 0.5 wt. % or greater molybdenum and at least 5 wt. % or greater nickel, wherein the disc like elements are machined or polished to remove scale from the casting process,

wherein an endothermic electrochemical oxidative reaction occurs within the chamber when a liquid comes into contact with the disc-like elements which results in cooling of the liquid.

42. The reverse flow apparatus according to claim 41, wherein the spiral apparatus includes a housing having an inflow portion for receiving one or more untreated liquids, a treatment portion containing the chamber for treating the one or more untreated liquid, and an outflow portion for releasing the treated one or more liquids.

43. The reverse flow apparatus according to claim 41 or claim 42, wherein the disc-like elements are made of stainless-steel containing molybdenum (Mo) and nickel (Ni).

44. The reverse flow apparatus according to any one of claims 41-43, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. %

~~molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.~~

~~45. The reverse flow apparatus according to claim 44, wherein the metal alloy of the disc-like elements comprise about 5 wt. % or more nickel, about 10 wt. % or more nickel, about 15 wt. % or more nickel, about 20 wt. % or more nickel, about 25 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.~~

~~46. The reverse flow apparatus according to claim 45, wherein the metal alloy of the disc like elements comprise 316L stainless steel, 317L stainless steel or 904L stainless steel.~~

~~47. The reverse flow apparatus according to any one of claims 41-46, wherein 100% of the milling scale comprising dielectric contaminants being removed from the surface of the disc-like elements.~~

~~48. The reverse flow apparatus according to any one of claims 41-47, wherein the disc-like elements are machined or polished with a non-ionic sanding grit which contains no metal contaminants.~~

~~49. The reverse flow apparatus according to any one of claims 41-48, wherein the at least one edge within the disc-like elements is water jet cut.~~

1~~50~~. A method of processing a hydrocarbon-bearing source material, the method~~making a reverse flow apparatus~~ comprising:

passing the hydrocarbon-bearing source material though an apparatus at a pressure within a range of about 70 psi to about 125 psi, the apparatus including:

an inflow portion for receiving the hydrocarbon-bearing source material,

a treatment portion for treating the hydrocarbon-bearing source material, wherein the treatment portion includes a molybdenum-containing structure made of a corrosion-resistant alloy including molybdenum, wherein the treatment portion further includes at least two contact surface planes separated by cavitation spaces, and

an outflow portion for outputting a hydrocarbon-bearing processed material;

taking the processed material from the output.~~providing a series of two or more sequential disc-like elements, wherein the disc-like elements comprise a metal alloy comprising at least 0.5 wt. % or greater molybdenum and at least 5 wt. % or greater nickel, wherein each disc-like element comprises a surface, a circumference and one or more S-shaped members extending from a point in the circumference to another point in the circumference and across a center of the disc-like element;~~

~~machining or polishing the disc-like elements to remove scale from the casting process;~~

~~water jet cutting the disc-like elements to form at least one razor sharp edge within the disc-like elements;~~

~~mounting the series two or more disc-like elements on a shaft, wherein the two or more sequential disc-like elements are mounted along the shaft in a twist arrangement such that at least one disc-like elements in the apparatus has its S-shaped member in a forward-facing position and at least one disc-like elements in the apparatus has its S-shaped member in a reverse-facing position;~~

~~providing a chamber; and~~

inserting the series of two or more sequential disc-like elements mounted on the shaft within the chamber so that the disc-like elements extend axially through the chamber.

51. The method according to claim 50, comprising:

fitting the series of two or more sequential disc-like elements mounted on the shaft within the chamber within a housing having an inflow portion for receiving one or more untreated liquids, a treatment portion containing the chamber for treating the one or more untreated liquid, and an outflow portion for releasing the treated one or more liquids.

52. The method according to claim 50 or claim 51, wherein the disc-like elements are made of stainless steel containing molybdenum (Mo) and nickel (Ni).

53. The method according to any one of claims 50-52, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. % molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.

54. The method according to any one of claims 50-53, wherein the disc-like elements are made of a metal alloy comprising about 5 wt. % or more nickel, about 10 wt. % or more nickel, about 15 wt. % or more nickel, about 20 wt. % or more nickel, about 25 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.

55. The method according to claim 54, wherein the metal alloy of the disc-like elements comprise 316L stainless steel, 317L stainless steel or 904L stainless steel.

56. The method according to any one of claims 50-55, wherein the step of machining or polishing the disc-like elements to remove scale from the casting process comprises removing 100% of the milling scale comprising dielectric contaminants from the surface of the disc-like elements.

57. The method according to any one of claims 50-56, wherein the step of machining or polishing the disc-like elements to remove scale from the casting process comprises using a non-ionic sanding grit which contains no metal contaminants.

58. The method according to any one of claim 50-57, wherein the step of machining or polishing the disc-like elements to remove scale from the casting process is completed to a Number 4 Grade.

59. The method according to any one of claims 50-58, wherein the water jet cutting of the disc-like elements is completed using a Number 5 Grade water jet cut.

~~60. The method according to any one of claims 50-59, wherein the surface of the disc-like elements are covered in plastic while being water jet cut.~~

~~61. The method according to any one of claims 50-60, wherein there is no heat applied to the surface of disc-like elements.~~

~~62. A system for treating liquid solutions or emulsion, the system including a source of the liquid solution or emulsion and a reverse flow apparatus according to any of claims 41 to 49, the inflow portion of the reverse flow apparatus being operatively connected to the source and which injects the liquid solution or emulsion into the chamber at a pressure of 125 or about 125 psi.~~

~~63. The system according to claim 62, wherein the system further comprises at least one of a filtration device, a UV sterilizer and a Z potential crystal generator, wherein the reverse flow apparatus, the source and the at least one of the filtration device, the UV sterilizer and the Z potential crystal generator are in liquid communication with one another.~~

~~64. The system according to claim 63, wherein the system further comprises a filtration device, a UV sterilizer and a Z potential crystal generator, wherein the reverse flow apparatus, the source, the filtration device, the UV sterilizer and the Z potential crystal generator are in liquid communication with one another.~~

~~65. The system according to any one of claims 62-64, wherein the system comprises multiple reverse flow apparatuses according to any one of claims 41 to 49.~~

~~66. A liquid emulsion processed with the reverse flow apparatus according to any one of claims 41 to 49.~~

2~~67~~. The method of claim 1, wherein the hydrocarbon-bearing source material comprises~~The liquid emulsion according to claim 66, wherein the liquid emulsion is~~ an oil-in-water emulsion, and wherein the hydrocarbon-bearing processed material comprises separate aqueous and oil phases.

~~68. A method of cracking an oil-in-water emulsion, the method comprising passing the oil-in-water emulsion though the reverse flow apparatus according to any one of claims 41 to 49 to obtain a processed material whereby a separate aqueous phase and oil phase is produced, wherein cracking of the oil-in-water emulsion occurs at a pressure of about 70 to about 125 psi.~~

3~~69~~. The method of claim 2~~according to claim 68, wherein the method~~ further comprisinges pyrolyzing the oil-in-water emulsion to obtain a derivative~~,~~ and ~~wherein the method comprises~~ passing the derivative~~, instead of the oil-in-water emulsion,~~ through the ~~reverse flow~~ apparatus ~~according to any one of claims 41 to 49~~.

~~70. The method according to claim 69, wherein the cracking of the oil-in-water emulsion does not include the addition of flocculants within the reverse flow apparatus according to any one of claims 41-49.~~

4~~71~~. The method of claim 2~~cracking the oil-in-water emulsion according to any one of claims 68–70~~, wherein the oil-in-water emulsion comprises~~is~~ oily wastewater, a petroleum feedstock, or a part of a secondary oil recovery system.

5. The method of claim 1 performed without the addition of a flocculant.

6. The method of claim 1, further comprising an endothermic electrochemical oxidative reaction occurring when the hydrocarbon-bearing source material contacts the molybdenum-containing structure which results in cooling of the hydrocarbon-bearing source material.

7~~2~~. The~~A~~ method of claim 1~~lowering the viscosity of liquid solution or emulsion containing oil~~, wherein the hydrocarbon-bearing source material comprises a~~the method comprising passing the~~ liquid solution or emulsion containing oil, and wherein the hydrocarbon-bearing ~~through the reverse flow apparatus according to any one of claims 41 to 49 to obtain a~~ processed material has~~ving~~ a lower viscosity than the hydrocarbon-bearing source material~~liquid solution or emulsion containing oil, thereby lowering the viscosity of the liquid solution or emulsion containing oil~~.

~~73. A method of cracking a liquid comprising passing the liquid through the reverse flow apparatus of any one of claims 41 to 49 to obtain a cracked liquid.~~

~~74. The method of cracking a liquid of claim 73, wherein the cracked liquid contains contain more hydrocarbons having shorter carbon chain species relative to the liquid.~~

~~75. The method of cracking a liquid according to claim 73 or claim 74, wherein the method is devoid of solvents.~~

~~76. The method of cracking a liquid of any one of claims 73–75, wherein the liquid is an emulsion, a petroleum feedstock or a part of a secondary oil recovery system.~~

8. A system to process a hydrocarbon-bearing source material, the system comprising:
a machine to pressurize the hydrocarbon-bearing source material; and
an apparatus comprising:
a housing having an inflow portion connected to the machine to receive the hydrocarbon-bearing source material at a pressure of within a range of about 70 psi to about 125 psi;
a treatment portion for treating the hydrocarbon-bearing source material, wherein the treatment portion includes a molybdenum-containing structure made of a corrosion-resistant alloy including molybdenum, wherein the treatment portion further includes at least two contact surface planes separated by cavitation spaces; and
an outflow portion to output a hydrocarbon-bearing processed material.

9. The system of claim 8, wherein the hydrocarbon-bearing source material comprises an oil-in-water emulsion, and wherein the hydrocarbon-bearing processed material comprises separate aqueous and oil phases.

10. The system of claim 8, wherein the molybdenum-containing structure is machined or polished to remove scale from a casting process.

11. The system of claim 8, wherein the molybdenum-containing structure comprises at least two disc-like elements are mounted on a shaft extending axially through the housing, the disc-like elements being separated by a distance, each disc-like element having a first wall facing the inflow portion, a second wall facing the outflow portion and a peripheral wall extending between the first and second walls, the disc-like elements being mounted on a shaft, wherein the disc-like element comprises any geometric shape, wherein the distance between the disc-like elements provides for a cavitation space.

12. The system of claim 11, wherein the contact surface plane forms a surface on the disc-like elements which is machined or polished to remove scale from a casting process.

13. The system of claim 11, wherein the disc-like elements are made of a metal alloy comprising about 1.0 wt. % or more molybdenum, about 1.5 wt. % or more molybdenum, from about 3.0 wt. % to about 4.0 wt. % molybdenum, from about 4.0 wt. % to about 4.5 wt. % molybdenum, from about 4.0 wt. % to about 5.0 wt. % molybdenum, from about 5.0 wt. % to about 6.0 wt. % molybdenum, from about 6.0 wt. % to about 7.0 wt. % molybdenum, from about 7.0 wt. % to about 8.0 wt. % molybdenum, from about 8.0 wt. % to about 9.0 wt. % molybdenum, from about 9.0 wt. % to about 10.0 wt. % molybdenum, from about 10.0 wt. % to about 15.0 wt. % molybdenum, from about 15.0 wt. % to about 20.0 wt. % molybdenum, from about 20.0 wt. % to about 25.0 wt. % molybdenum, from about 25.0 wt. % to about 30.0 wt. % molybdenum, from about 30.0 wt. % to about 35.0 wt. % molybdenum, from about 35.0 wt. % to about 40.0 wt. % molybdenum, from about 0.5 wt. % to about 40.0 wt. % molybdenum, or up to about 40 wt. % molybdenum.

14. The system of claim 13, wherein the metal alloy of the disc-like elements further comprise about 5.0 wt. % or more nickel, about 10.0 wt. % or more nickel, about 15.0 wt. % or more nickel, about 20.0 wt. % or more nickel, about 25.0 wt. % or more nickel, from about 5.0 wt. % to about 10.0 wt. % nickel, from about 10.0 wt. % to about 15.0 wt. % nickel, from about 15.0 wt. % to about 20.0 wt. % nickel, or from about 20.0 wt. % to about 25.0 wt. % nickel.

15. The system of claim 14, wherein the metal alloy is 316L stainless steel, 317L stainless steel, or 904L stainless steel.

16. The system of claim 11, wherein a surface of the disc-like elements is free of dielectric contaminants.

17. The system of claim 11, wherein the disc-like elements are machined or polished with a non-ionic sanding grit which contains no metal contaminants.

18. The system of claim 11, wherein the at least one edge within the disc-like elements is water jet cut.

19. The system of claim 11, wherein apparatus includes between 2 and 30 disc-like elements.

20. The system of claim 8, wherein the hydrocarbon-bearing source material comprises a liquid solution or emulsion containing oil, and wherein the hydrocarbon-bearing processed material has a lower viscosity than the hydrocarbon-bearing source material.