~~What is claimed is:~~CLAIMS

1. A method of removing carbon dioxide from ~~an aqueous stream or gaseous stream~~a fluid, the method comprising~~by~~:

contacting the ~~gaseous stream comprising carbon dioxide, when present,~~ fluid with an aqueous solution comprising ions capable of forming an insoluble carbonate and/or hydroxide salt;

contacting the aqueous solution ~~comprising carbon dioxide~~ with an ~~electroactive mesh~~electrode that induces ~~its~~ alkalinization, thereby ~~forcing~~ inducing the precipitation of a carbonate and/or hydroxide solid(s) from the solution~~; and~~

~~removing the precipitated carbonate solids from the solution, or the surface of the mesh where they may deposit~~.

2. The method of claim 1, wherein the ~~gaseous stream~~fluid is ~~present~~a gaseous fluid.

3. The method of claim 1 or 2, wherein the gaseous fluid~~stream~~ comprises between 0.04 to 100 vol. % CO_2.

4. The method of any one of claims 1 to 3, wherein the gaseous fluid is atmospheric air.

5. The method of any one of claims 1 to 4, wherein the gaseous fluid is flue gas emitted from a natural gas-fired power plant, a coal-fired power plant, an iron mill, a steel mill, a cement plant, an ethanol plant, ~~and~~ or a chemical manufacturing plant.

6. The method of any one of claims 1 to 5, wherein the aqueous solution contains an amount of dissolved carbon dioxide that is in equilibrium with the gaseous fluid~~stream~~.

7. The method of any one of claims 1 to 6, wherein the aqueous solution is in thermal equilibrium with the gaseous fluid~~stream~~.

8. The method of any one of claims 1 to 6, wherein the aqueous solution is not in thermal equilibrium with the gaseous fluid~~stream~~.

9. The method of any one of claims 1 to 6, wherein the aqueous solution contains an amount of dissolved carbon dioxide that is not in equilibrium with the gaseous fluid.

~~9~~10. The method of claim 1, wherein the fluid is a liquid fluid~~gaseous stream is not present~~.

~~10~~11. The method of any one of claims 1 to ~~9~~10, wherein the ions capable of forming an insoluble carbonate salt comprise ions including one or more of: ~~the following~~ Ca, Mg, Ba, Sr, Fe, Zn, Pb, Cd, Mn, Ni, Co, Cu, and Al.

~~11~~12. The method of any one of claims 1 to ~~10~~11, wherein the aqueous solution has a concentration of NaCl of about 1,000 ppm or more.

~~12~~13. The method of any one of claims 1 to ~~11~~12, wherein the aqueous solution has a concentration of NaCl of about 30,000 ppm or more.

~~13~~14. The method of any one of claims 1 to ~~12~~13, wherein the aqueous solution comprises seawater.

~~14~~15. The method of any one of claims 1 to ~~13~~14, wherein the ~~electroactive mesh~~electrode comprises a ~~mesh cathode that comprises a~~ metallic, ~~or~~ a non-metallic ~~composition~~, or a carbon-based mesh.

~~15~~16. The method of any one of claims 1 to ~~14~~15, wherein the method utilizes an end-to-end energy intensity of about 2.5 MWh or less per ton of carbon dioxide mineralized.

~~16~~17. The method of any one of claims 1 to ~~15~~16, wherein the aqueous solution contains an amount of dissolved carbon dioxide that is buffered to atmospheric abundance.

~~17~~18. The method of any one of claims 1 to ~~16~~17, wherein the ~~electroactive mesh~~electrode produces an increased alkaline condition, *in situ*, in the aqueous solution within about 2 to 20000 µm of the ~~electroactive mesh~~electrode.

~~18~~19. The method of claim ~~17~~18, wherein the alkalinized condition is a pH of ~~9~~ 8 or greater.

~~19~~20. The method of any one of claims 1 to ~~18~~19, wherein the ~~electroactive mesh consists of~~ electrode comprises a metallic, a non-metallic, or a carbon-based ~~mesh~~material.

~~20~~21. The method of claim ~~19~~20, wherein the ~~electroactive mesh~~electrode contains stainless steel, titanium oxide, carbon nanotubes, polymers, ~~and/or~~ graphite, or ~~other hybrid compositions of these materials~~any combination thereof.

~~21~~22. The method of any one of claims 1 to ~~20~~21, wherein the ~~electroactive mesh~~electrode comprises pores having a diameter in the range of about 0.1 µm to about 10000 µm.

~~22~~23. The method of any one of claims 1 to ~~21~~22, wherein the electrode comprises an electroactive mesh, and inducing the precipitation of the carbonate and/or hydroxide solid(s) includes rotating a cylinder consisting of the electroactive mesh in the solution, while applying suction to draw the solution onto the outer surface of the mesh.

~~23~~24. The method of any one of claims 1 to ~~22~~23, wherein the solution is a brine solution.

~~24~~25. The method of any one of claims 1 to ~~23~~24, wherein the solution is an alkaline metal-containing solution.

~~25~~26. The method of any one of claims 1 to ~~24~~25, wherein inducing precipitation of the carbonate and/or hydroxide solid(s) includes inducing precipitation of at least one carbonate ~~having~~ or hydroxide of Ca, Mg, Ba, Sr, Fe, Zn, Pb, Cd, Mn, Ni, Co, Cu, or Al.

~~26~~27. A flow-through electrolytic reactor comprising an intake device in fluid connection with a rotating cylinder comprising an ~~electroactive mesh~~electrode, and a scraping device and/or liquid-spray based device for separating a solid from a surface or solution.

~~27~~28. The flow-through electrolytic reactor of claim ~~26~~27, further comprising an aqueous solution comprising carbon dioxide, Ca ions, and Mg ions.

~~28~~29. The flow-through electrolytic reactor of claim ~~16~~ 27 or ~~17~~28, wherein the ~~electroactive mesh~~electrode is capable of inducing removal of dissolved inorganic carbon by precipitation of a carbonate and/or hydroxide solid from an aqueous solution comprising carbon dioxide and ions capable of forming an insoluble carbonate and/or hydroxide salt.

~~29~~30. The flow-through electrolytic reactor of any one of claims ~~26~~ 27 to ~~28~~29, wherein the ~~electroactive mesh~~ electrode contains a metallic or carbon-based mesh.

~~30~~31. The flow-through electrolytic reactor of claim ~~29~~30, wherein the ~~electroactive mesh~~electrode contains stainless steel, titanium oxide, carbon nanotubes, polymers, ~~and/or~~ graphite, or ~~hybrid compositions of these materials~~any combination thereof.

~~31~~32. The flow-through electrolytic reactor of any one of claims ~~26~~ 27 to ~~30~~31, wherein the reactor comprises a plurality of ~~electroactive meshes~~electrodes.

~~32~~33. The flow-through electrolytic reactor of claim ~~31~~32, wherein the plurality of ~~electroactive meshes~~electrodes are arranged in a series of planar cells in parallel or cylindrical cells in parallel.

~~33~~34. The flow-through electrolytic reactor of any one of claims ~~16~~ 27 to ~~32~~33, wherein the reactor is in fluid communication with a desalination device.

35. The method of claim 10, wherein the liquid fluid is an aqueous fluid.

36. The method of claim 35, wherein a gaseous stream is bubbled through the liquid fluid before the liquid fluid is contacted with the aqueous solution.