CLAIMS

1. A multistage electrochemical hydrogen pump (100, 200, 500), comprising:

a first electrochemical hydrogen pumping stage fluidly connected to a second electrochemical hydrogen pumping stage,

wherein the first electrochemical pumping stage is configured to receive a first gas mixture comprising hydrogen gas, electrochemically separate hydrogen gas from the first gas mixture to produce a second gas mixture, and output the second gas mixture to the second electrochemical pumping stage, and

wherein the second electrochemical hydrogen pumping stage is configured to receive the second gas mixture from the first electrochemical hydrogen pumping stage, electrochemically separate hydrogen gas from the second gas mixture to produce a third gas mixture, and output the third gas mixture and characterised in that wherein the first and second electrochemical hydrogen pumping stages are fluidly connected to each other via a channel defined by bipolar plates.

2. The multistage electrochemical hydrogen pump of claim 1, wherein one or both of the first and second electrochemical hydrogen pumping stages comprise a plurality of electrochemical cells fluidly connected in parallel with each other.

3. The multistage electrochemical hydrogen pump of claim 2, wherein the plurality of electrochemical cells of one or both of the first and second electrochemical hydrogen pumping stages are arranged as a stack.

4. The multistage electrochemical hydrogen pump of any of claim 2 or 3, wherein each of the first and second electrochemical hydrogen pumping stages comprises a plurality of electrochemical cells fluidly connected in parallel with each other, and wherein an output of each of the plurality of electrochemical cells

of the first electrochemical hydrogen pumping stage is fluidly connected to an input of each of the plurality of electrochemical cells of the second electrochemical hydrogen pumping stage.

5. The multistage electrochemical hydrogen pump of any of claims 1 to 4, further comprising a housing, wherein the first and second electrochemical hydrogen pumping stages are located within the housing.

6. The multistage electrochemical hydrogen pump of any of claims 1 to 5, wherein the second gas mixture has a greater proportion of hydrogen gas compared to the first gas mixture, and the third gas mixture has a greater proportion of hydrogen gas compared to the second gas mixture.

7. The multistage electrochemical hydrogen pump of any of claims 1 to 6, wherein the first gas mixture is made up of hydrogen gas and one or more other types of gas, wherein the one or more other types of gas are selected from the group consisting of: nitrogen gas, carbon dioxide gas, helium gas, argon gas, carbon monoxide gas.

8. The multistage electrochemical hydrogen pump of any of claims 1 to 7, wherein the hydrogen gas comprises one or more of: protium, deuterium and tritium.

9. The multistage electrochemical hydrogen pump of any of claims 1 to 8, further comprising one or more further electrochemical hydrogen pumping stages fluidly connected in series to the first and second electrochemical hydrogen pumping stages.

10. A vacuum pumping system comprising the multistage electrochemical hydrogen pump of any of claims 1 to 9.

11. The vacuum pumping system of claim 10, wherein the multistage electrochemical hydrogen pump is fluidly connected to a vacuum pump and configured to receive the first gas mixture from the vacuum pump.

12. An extreme ultraviolet lithography system comprising the vacuum pumping system of claim 10 or 11.

13. The extreme ultraviolet lithography system of claim 12, wherein the first gas mixture is made up of hydrogen gas and nitrogen gas.

14. Use of the multistage electrochemical hydrogen pump of any of claims 1 to 9 to pump hydrogen gas.