

Claims

1. A system for transferring energy, the system comprising a recirculation duct, with a pump to circulate gas around the recirculation duct and a control nozzle to form a jet of gas;
5 means to provide hydrogen gas into the duct; an electrical device to provide energy into the jet of gas so as to form hydrogen atoms; a heat exchanger within the recirculation duct downstream of the electrical device, onto which the flowing jet of gas impacts; and means to subject the region of the jet of gas between the electrical device and the heat exchanger to a magnetic or electric field.
- 10 2. A system as claimed in claim 1 wherein the electrical device to form hydrogen atoms consists of a pair of opposed tungsten electrodes are spaced apart to define a gap, between which electrodes and electrical DC or AC voltage is applied, so as to produce an electrical arc, arranged such that in use hydrogen gas flows through the gap between the electrodes, the
15 direction of gas flow emerging from the gap being substantially orthogonal to the direction of the electrical arc.
3. A system as claimed in claim 2 wherein hydrogen gas is supplied to the gap from a nozzle aligned such that the gas flowing into the gap flows in a direction substantially orthogonal to the
20 direction of the electrical arc.
4. A system as claimed in claim 1 wherein the electrical device to form hydrogen atoms consists of a tungsten wire, and an electrical source to electrically heat the tungsten wire.
- 25 5. A system as claimed in any one of the preceding claims wherein the field-generating means is an electromagnetic coil arranged to provide a magnetic field.
6. A system as claimed in claim 5 wherein the magnetic field is substantially parallel to the direction of the jet of gas.
- 30 7. A system as claimed in any one of the preceding claims wherein means are provided to produce an electric field in a direction substantially parallel to the centre line of the jet of gas.
8. A system as claimed in claim 7 wherein the electric field-generating means comprises
35 two electrodes, each defining an aperture through which the jet of gas can flow.

9. A system as claimed in claim 8 wherein one electrode is an annular plate electrode, and the other electrode is a tubular electrode.

10. A system as claimed in any one of the preceding claims wherein the heat exchanger is
5 immediately adjacent to a fuel cell.

11. A system as claimed in claim 10 wherein the heat exchanger forms part of a wall of the recirculation duct.

10 12. A method for transferring energy using a system as claimed in any one of the preceding claims.

13. A method as claimed in claim 12 wherein the quantity of hydrogen, the operation of the pump, and the restriction from the nozzle are selected such as to ensure that the region of the
15 recirculation duct between the nozzle and the heat exchanger is at a reduced pressure, less than 20 kPa.

14. A method as claimed in claim 12 or claim 13 wherein the field-generating means is an electromagnetic coil arranged to provide a magnetic field, and the current through the
20 electromagnetic coil is adjusted and varied so as to vary the position at which any ions within the flowing jet of gas impact on the heat exchanger.

15. A method as claimed in claim 14 wherein the current through the electromagnetic coil is an alternating current.
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16. A method as claimed in claim 15 wherein the alternating current is at a frequency less than 100 Hz.

17. A method as claimed in any one of claims 12 to 16 wherein the hydrogen gas is provided
30 by electrolysis of water.

18. A method as claimed in claim 17 wherein the electric power for electrolysis is provided by a solar panel.

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