WHAT IS CLAIMED IS:

1. A water treatment device, comprising:

an electro-coagulation (EC) unit for reating a stream of feed water to produce a stream of EC treated water of lower salinity than the stream of feed water;

an electrical separation unit for treating the stream of EC treated water to obtain a stream of product water of lower salinity than the EC treated water; and

a precipitation unit for providing a stream of wash water to wash the electrical separation unit and become a stream of reject water flowing back to the precipitation unit, wherein precipitation in the precipitation unit produces the stream of wash water of lower salinity than the stream of reject water.

2. The water treatment device according to claim 1, wherein the stream of EC treated water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of feed water.

3. The water treatment device according to claim 1, wherein the stream of product water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of EC treated water.

4. The water treatment device according to claim 1, further comprising a membrane desalination unit before the EC unit.

5. The water treatment device according to claim 4, wherein the membrane desalination unit is a reverse osmosis membrane device.

6. The water treatment device according to claim 1, wherein the electrical separation unit comprises at least one of an electrodialysis reversal desalination device and a supercapacitive desalination device.

7. A water treatment method comprising:

treating a stream of feed water in an electro-coagulation (EC) unit to produce a stream of EC treated water of lower salinity than the stream of feed water;

treating the stream of EC treated water in an electrical separation unit to obtain a stream of product water of lower salinity than the EC treated water;

providing from a precipitation unit a stream of wash water to wash the electrical separation unit and become a stream of reject water, wherein precipitation in the precipitation unit produces the stream of wash water of lower salinity than the stream of reject water.

8. The water treatment method according to claim 7, wherein the stream of feed water is from a membrane desalination unit.

9. The water treatment method according to claim 8, wherein the membrane desalination unit is a reverse osmosis membrane device.

10. The water treatment method according to claim 7, wherein the electrical separation unit is an electrodialysis reversal desalination device or a supercapacitive desalination device.

11. The water treatment method according to claim 7, wherein the stream of EC treated water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of feed water.

12. The water treatment method according to claim 7, wherein the stream of product water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of EC treated water.

WHAT IS CLAIMED IS:

1. A water treatment device, comprising:

an electro-coagulation (EC) unit for treating a stream of feed water to produce a stream of EC treated water of lower salinity than the stream of feed water;

an electrical separation unit for treating the stream of EC treated water to obtain a stream of product water of lower salinity than the EC treated water, the electrical separation unit comprising at least one of an electrodialysis reversal desalination (EDR) device and a supercapacitor desalination (SCD) device; and

a precipitation unit for providing a stream of wash water to wash the electrical separation unit and become a stream of reject water flowing back to the precipitation unit, wherein precipitation in the precipitation unit produces the stream of wash water of lower salinity than the stream of reject water,

wherein the stream of EC treated water flows to the electrical separation unit without flowing through the precipitation unit.

2. The water treatment device according to claim **1**, wherein the stream of EC treated water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of feed water.

3. The water treatment device according to claim **1**, wherein the stream of product water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of EC treated water.

4. The water treatment device according to claim **1**, further comprising a membrane desalination unit before the EC unit.

5. The water treatment device according to claim **4**, wherein the membrane desalination unit is a reverse osmosis membrane device.

6. The water treatment device according to claim **1**, wherein the electrical separation unit comprises the EDR device and the SCD device.

7. A water treatment method comprising:

treating a stream of feed water in an electro-coagulation (EC) unit to produce a stream of EC treated water of lower salinity than the stream of feed water;

treating the stream of EC treated water in an electrical separation unit to obtain a stream of product water of lower salinity than the EC treated water, the electrical separation unit comprising at least one of an electrodialysis reversal desalination (EDR) device and a supercapacitor desalination (SCD) device; and

providing a stream of wash water from a precipitation unit to wash the electrical separation unit and become a stream of reject water, wherein precipitation in the precipitation unit produces the stream of wash water of lower salinity than the stream of reject water,

wherein the stream of EC treated water flows to the electrical separation unit without flowing through the precipitation unit.

8. The water treatment method according to claim **7**, wherein the stream of feed water is from a membrane desalination unit.

9. The water treatment method according to claim **8**, wherein the membrane desalination unit is a reverse osmosis membrane device.

10. The water treatment device according to claim **7**, wherein the electrical separation unit comprises the EDR device and the SCD device.

11. The water treatment method according to claim **7**, wherein the stream of EC treated water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of feed water.

12. The water treatment method according to claim **7**, wherein the stream of product water is lower in at least one of hardness, alkalinity, and silica concentration than the stream of EC treated water.