Claims

1. A method for selectively binding, transporting and storing carbon dioxide in aqueous media, characterized by the steps of:

(a) providing an aqueous acceptor solution containing at least one acceptor compound having a free guanidino and/or amidino group,

b) contacting a gas containing carbon dioxide with the acceptor solution from step a),

c) transporting bound carbon dioxide/carbon dioxide derivatives in the acceptor solution of step b) through a separation membrane into an aqueous uptake and release medium; or

storing and/or transporting the acceptor solution containing bound carbon dioxide/carbon dioxide derivatives from step b).

2. The method according to claim 1, wherein the acceptor compound is an amino acid and the pH of the acceptor solution is in a range between 8 and 13.

3. The method according to claim 1 or 2, wherein in step b) the contacting is performed without pressurization of the acceptor solution.

4. The method according to any one of claims 1 to 3, wherein step b) or c) is followed by step c1) or d1): releasing the carbon dioxide bound in the acceptor solution as a gas phase.

5. The method according to any one of claims 1 to 4, wherein the acceptor solution from step b) is located in or introduced into an acceptor chamber of an electrodialysis device and the transport of carbon dioxide/carbon dioxide derivatives according to step c) is performed by means of an electrical gradient established between the acceptor chamber and an uptake and release chamber, wherein the acceptor chamber(s) and the uptake and release chamber(s) are separated from each other by the separation membrane.

6. The method according to claim 5, wherein the separation membrane is a membrane permeable to ions and/or gas molecules.

7. The method according to claim 5, wherein a release of the carbon dioxide/carbon dioxide derivatives transported through the separation membrane in form of a pure carbon dioxide gas with > 98.5 vol.% carbon dioxide is performed in the uptake and release chamber.

8. The method according to any one of claims 5 to 7, wherein the uptake and release chamber contains an uptake and release medium containing at least one compound having at least one acid group and having an isoelectric point in the range between 3 and 5.

9. The method according to any one of claims 1 to 8, in which one or more reaction compounds for the reaction and/or binding of carbon dioxide and/or carbonate/hydrogen carbonate anions are present in the acceptor solution and/or the uptake and release medium.

10. The method according to any one of claims 1 to 9, wherein, after step b), the carbon dioxide bound in the acceptor solution is converted to a carbon compound by means of a reaction compound.

11. The method according to any one of claims 1 to 10, wherein, after step c), the carbon dioxide bound in the uptake and release medium or the transported and released carbon dioxide is converted into a carbon compound by means of a reaction compound.

12. The method according to any one of claims 1 to 11 wherein step c) is followed by steps c3') and c3):

c3') introducing the aqueous uptake and release medium containing bound carbon dioxide/carbon dioxide derivatives from step c) into a release device; and

c3) releasing carbon dioxide as a gas phase from the uptake and release medium containing bound carbon dioxide/carbon dioxide derivatives from step c3') in the release chamber.

13. The method according to any one of claims 1 to 12 in which cathodic separation of carbon dioxide as a pure gas phase from the aqueous acceptor solution is performed.

14. The method according to any one of claims 1 to 13 wherein the gas containing carbon dioxide is washed by means of an acidic solution before step b).

15. The method according to claim 9, wherein the reaction compound is an aluminum salt, preferably aluminum chloride; or

wherein the reaction compound is an aluminum salt, preferably aluminum chloride and wherein aluminum carbonate and/or aluminum hydrogen carbonate is produced.