Claims

1. A method for regenerating a used sorbent having a gas adsorbate adsorbed thereto, comprising exposing the used sorbent to dielectric heating, wherein the used sorbent comprises a liquid marble, wherein the liquid marble is comprised of a plurality of particles and/or mixture of a plurality of particles encapsulating at least one type of liquid therein.
2. The method according to claim 1, wherein exposing the used sorbent to dielectric heating comprises exposing the used sorbent to microwave radiation.
3. The method according to claim 2, wherein the used sorbent is exposed to microwave radiation in a microwave synthesizer.
4. The method according to claim 3, wherein the microwave synthesizer is configured to operate at 100 to 1,200 Watts.
5. The method according to claim 4, wherein the microwave synthesizer is configured to operate at 500 to 1,200 Watts.
6. The method according to claim 2, wherein the used sorbent is exposed to microwave radiation for 3 hours or less.
7. The method according to claim 6, wherein the used sorbent is exposed to microwave radiation for 1 hour or less.
8. The method according to claim 2, wherein the used sorbent is exposed to microwave radiation for an interval of 10-30 seconds.
9. The method according to claim 2, wherein the used sorbent is exposed to microwave radiation at 90-150 °C.
10. The method according to claim 9, wherein the used sorbent is exposed to microwave radiation at 90-120 °C.

11. The method according to claim 2, wherein the used sorbent is exposed to microwave radiation in the absence of an inert purge gas.
12. The method according to claim 1, wherein the gas adsorbate comprises natural gas, flue gas, carbon monoxide, carbon dioxide, hydrogen sulfide, water vapour, a sulfur-containing gas, a malodorous gas, a toxic gas, or a mixture thereof.
13. The method according to claim 1, wherein the at least one type of liquid is selected from the group consisting of ionic liquid, alkanolamine, molecule containing amine functionality, desiccant, glycol, a solution thereof, amine-containing oligomers or polymers and a mixture thereof.
14. The method according to claim 13, wherein the alkanolamine comprises ethanolamine, preferably monoethanolamine (MEA), diethanolamine (DEA), triethanolamine (TEA), methyldiethanolamine (MDEA), or 2-amino-2-methyl-1-propanol (AMP).
15. The method according to claim 14, wherein the alkanolamine comprises neat MEA or an aqueous solution of MEA.
16. The method according to claim 13, wherein the at least one type of liquid comprises a mixture of at least one alkanolamine and at least one further amine.
17. The method according to claim 16, wherein the at least one alkanolamine comprises MEA, DEA, or AMP and the at least one further amine comprises piperazine.
18. The method according to claim 14, wherein the alkanolamine comprises neat DEA or an aqueous solution of DEA.
19. The method according to claim 1, wherein the plurality of particles comprises or consists of a material selected from the group consisting of a metal, a metal oxide, an organic compound, a polymer, a composite, and a mixture thereof.

20. The method according to claim 19, wherein the plurality of particles is comprised of titanium dioxide (TiO_2), zinc oxide (ZnO), aluminium oxide (Al_2O_3), or cerium oxide (CeO_2).