CLAIMS

1. Solid-state compressor for electrochemically compressing a fluid, comprising:
   - a compressor cell stack, comprising at least one compressor cell having a membrane electrode assembly sandwiched between two cell plates,
   - an enclosure, clamping the compressor cell stack at opposing sides thereof, and
   - at least one contact body, interposed between the compressor cell stack and the enclosure and contacting an outer surface of the compressor cell stack,

   wherein

   a space is enclosed between the enclosure and the contact body, which space is configured to contain a hydraulic fluid under pressure.

2. Solid-state compressor according to claim 1, wherein the solid-state compressor comprises a pressure adjustment mechanism configured for adjusting the pressure of the hydraulic fluid contained in the space.

3. Solid-state compressor according to claim 2, wherein the pressure adjustment mechanism is configured to adjust the hydraulic fluid pressure based on a pressure prevailing on a cathode side of the at least one membrane electrode assembly.

4. Solid-state compressor according to claim 3, wherein the pressure adjustment mechanism is configured for keeping a fixed ratio between the pressure prevailing on the cathode side of the at least one membrane electrode assembly and the hydraulic fluid pressure.

5. Solid-state compressor according to claim 4, wherein the hydraulic fluid pressure is larger, preferably between 1,1 times and 2,5 times larger, and more preferably 2 times larger than the pressure prevailing on the cathode side of the at least one membrane electrode assembly.

6. Solid-state compressor according to any one of the claims 1-5, wherein the space is hydraulically linked with a hydraulic fluid reservoir.

7. Solid-state compressor according to claim 6 and any one of the claims 2-5, wherein the reservoir has a variable volume, wherein the pressure adjustment mechanism is configured for adjusting the volume of the hydraulic fluid reservoir.

8. Solid-state compressor according to claim 7, wherein the pressure adjustment mechanism comprises a displacer piston, comprising a first piston head surface standing in contact with the hydraulic fluid reservoir, for changing the volume of the hydraulic fluid reservoir upon displacement of the piston head.

9. Solid-state compressor according to claim 8, wherein the displacer piston comprises a second piston head surface opposing the first piston head surface, which second piston head surface stands in contact with a pressurized fluid reservoir for changing the volume of the pressurized fluid reservoir upon displacement of the piston head.

10. Solid-state compressor according to claim 9, wherein the cathode side of the at least one membrane electrode assembly is linked with the pressurized fluid reservoir~~.~~, and/or

~~11. Solid-state compressor according to claim 9 or 10,~~ wherein the areas of the first and second piston head surfaces mutually differs.

~~12~~11. Solid-state compressor according to any one of the preceding claims, wherein the solid-state compressor comprises two contact bodies, each interposed between the enclosure and a different one of two opposing sides of the compressor cell stack, wherein a space is enclosed between the enclosure and the respective contact bodies, which spaces are configured to contain a hydraulic fluid under pressure.

~~13~~12. Solid-state compressor according to claim ~~12~~11, wherein the contact bodies are moveably embedded within the enclosure such that the volume of the spaces between the enclosure and the respective contact bodies changes upon a movement of the contact bodies relative to the enclosure~~.~~

~~14. Solid-state compressor according to claim 12 or 13~~, and/or wherein the spaces between the enclosure and the respective contact bodies are hydraulically linked with each other.

~~15~~13. Solid-state compressor according to any one of the claims ~~12~~11-~~14~~12, wherein the enclosure comprises two opposing and interconnected flanges that respectively grip around each of the contact bodies, thereby entirely enclosing a surface of said contact bodies opposing the surface contacting an outer surface of the compressor cell stack.

~~16~~14. Solid-state compressor according to claim ~~15~~13, wherein the opposing flanges are mutually connected through a connection pre-loaded in tension, which preload urges the opposing flanges towards each other such that the hydraulic fluid contained in the spaces is compressed~~.~~, and/or

~~17. Solid-state compressor according to claim 15 or 16,~~ wherein the opposing flanges are interconnected by at least one bolted joint.

~~18~~15. Solid-state compressor according to claim ~~17~~14, wherein one or more Belleville washers are positioned between at least one of the flanges and a bolt head or nut of the bolted joint.

~~19~~16. Assembly of an enclosure and at least one contact body for a solid-state compressor according to any one of the preceding claims.

~~20~~17. Pressure adjustment mechanism for adjusting the pressure in a hydraulic fluid contained within a space enclosed between an enclosure and a contact body of a solid-state compressor according to any one of the claims 1-~~18~~15.

~~21~~18. Method for operating a solid-state compressor according to any one of the claims 1-~~18~~15, comprising introducing a hydraulic fluid under pressure in the space between the enclosure and the contact body.

~~22~~19. Method according to claim ~~21~~18, wherein the method further comprises adjusting the pressure in the hydraulic fluid, and~~.~~

~~23. Method according to claim 22,~~ wherein the pressure in the hydraulic fluid is adjusted based on the pressure prevailing on a cathode side of the at least one membrane electrode assembly.

~~24~~20. Method according to claim ~~23~~19, wherein a fixed ratio is kept between the pressure prevailing on the cathode side of the at least one membrane electrode assembly and the pressure in the hydraulic fluid, and~~.~~

~~25. Method according to claim 24,~~ wherein the pressure in the hydraulic fluid is kept larger, preferably between 1,1 times and 2,5 times larger, and more preferably 2 times larger than the pressure prevailing on the cathode side of the at least one membrane electrode assembly.