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 wherein the areas of the first and second piston head surfaces mutually differs.

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.

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

13. Solid-state compressor according to any one of the claims 11-12, 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.

14. Solid-state compressor according to claim 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 wherein the opposing flanges are interconnected by at least one bolted joint.

15. Solid-state compressor according to claim 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.

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

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 1-15.

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

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

20. Method according to claim 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 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.