CLAIMS

1. Use of calcium nitrate to modify the permeability of a hardened cementitious composition, wherein the cementitious composition comprises between 1 weight% to 4 weight% of calcium nitrate of the cement content of the cementitious composition, depending on the type of cement.

2. Use according to claim 1, wherein the cementitious composition is a concrete composition.

3. Use according to claim 2, wherein the concrete composition comprises 300 – 500 kg cement per m^3 hardened concrete, preferably Portland cement.

4. Use according to claim 3, wherein an amount of the cement is replaced by a cement replacement material at a concentration of between 0.1 weight% to 50 weight% of the cement content of the cementitious composition.

5. Use according to claim 4, wherein the cement replacement material is chosen out of any one of fly ash, ground granulated slag, lime stone or a combination thereof.

6. Use according to claim any one of the claims 2 to 5, wherein the concrete composition comprises 150 – 300 kg water per m^3 hardened concrete.

7. Use according to any one of the claims 2 to 6, wherein the concrete composition comprises between 1.500 – 1.800 kg aggregate per m^3 hardened concrete.

8. Use according to claim 7, wherein the aggregate comprises sand, gravel and stones.

9. Use according to any one of the claims 1 to 8, wherein calcium nitrate increases the density of voids with a void diameter below 300 μm by at least 10%; preferably at least 20%; more preferably at least 30 %; most preferably at least 40%.

10. Use according to any one of the claims 1 to 9, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 30 μm to at most 300 μm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

11. Use according to any one of the claims 1 to 10, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 50 μm to at most 150 μm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

12. Use according to any one of the claims 1 to 11, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 60 μm to at most 100 μm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

13. Pourable and curable concrete composition, comprising per m^3 cured concrete
    - between 300 and 500 kg cement;
    - between 150 and 300 kg water;
    - between 1.500 and 1.800 kg aggregate; and
    - between 1 weight% to 4 weight% of the cement content of the concrete composition, depending on the type of cement, of calcium nitrate.

14. Concrete composition according to claim 13, wherein an amount of cement is replaced by a cement replacement material at a concentration of between 0.1 weight% to 50 weight% of the cement content of the concrete composition.

15. Concrete composition according to claim 14, wherein the cement replacement material is chosen out of any one of fly ash, ground granulated slag, lime stone or a combination thereof.

16. Concrete composition according any one of the claims 13 to 15, wherein the aggregate comprises sand, gravel and stones.

17. Concrete composition according to any one of the claims 15 to 16, wherein the cement is Portland cement.

18. Use of calcium nitrate as an admixture for a steel reinforced concrete composition to increase the resistance towards carbonation of the steel reinforced hardened concrete, wherein the concrete composition comprises cement and the calcium nitrate at a dosage of 1 weight% to 4 weight% of the cement content of the concrete composition.

19. Use according to claim 18, wherein the concrete composition is a concrete composition according to any one of claims 13 to 17.

20. Use according to any of claims 18 or 19, wherein calcium nitrate increases the density of voids with a void diameter below to at most 300 μm by at least 10%; preferably at least 20%; more preferably at least 30 %; most preferably at least 40%.

21. Use according to any of claims 18 to 20, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 30 μm to at most 300 μm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

22. Use according to any of claims 18 to 21, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 50 μm to at most 150 μm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

23. Use according to any of claims 18 to 22, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 60 μm to at most 100 μm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

24. Steel reinforced concrete solid having an elevated resistance towards carbonation obtained from hardening the concrete composition according to any one of the claims 13 to 17.

25. Method for producing a steel reinforced concrete solid having an elevated resistance towards carbonation, comprising the steps of:

(I) preparing a concrete composition according to any one of the claims 13 to 17 comprising mixing the water, the cement, the aggregate and the calcium nitrate;

(II) casting the concrete composition into a form provided with a steel reinforcement; and

(III) having the concrete composition hardened into the steel reinforced concrete solid with the elevated resistance towards carbonation.