CLAIMS

1. Process for producing sodium sulphate from phosphogypsum, comprising:
- a step (101) of lixiviation of phosphogypsum by means of a basic solution comprising a chelating agent so as to obtain a sodium sulphate solution (S) containing metal impurities, wherein at least one part of said metal impurities form complexes with said chelating agent,
- at least one first step (103, 104) of filtration of the sodium sulphate solution by a nanofiltration membrane (NF1, NF2), so as to form a concentrate (C1, C2) containing said complexes and a permeate (P1, P2),
- a step (105) of evaporation of the permeate (P1, P2) so as to form anhydrous sodium sulphate.

2. Process according to claim 1, characterised in that the chelating agent is a hexadentate chelating agent comprising an amine and carboxyl group.

3. Process according to claim 2, characterised in that said chelating agent is selected from ethylene diamine tetraacetic acid (EDTA) and the sodium, potassium, calcium disodium, diammonium, triethanolamine (TEA-EDTA) salts thereof, hydroxyethyl ethylene diamine tetraacetic acid (HEDTA) and the trisodium salt thereof, and mixtures thereof.

4. Process according to one of claims 1 to 3, characterised in that the chelating agent comprises Na+, K+, Ca2+ and/or Cl- ions.

5. Process according to one of claims 1 to 4, characterised in that the chelating agent is present in the basic solution at a concentration of 0.1 to 0.8M, preferably at a concentration of 0.2 to 0.4M.

6. Process according to one of claims 1 to 5, characterised in that the cutoff point of the nanofiltration membrane (NF1) is comprised between 150 and 1000 $g.mol^{-1}$.

7. Process according to one of claims 1 to 6, characterised in that it comprises, after the first filtration step (103), a second step (104) of filtration of the permeate (P1) derived from the first step (103) on a nanofiltration membrane (NF1, NF2), and in that the evaporation step (105) is implemented on the permeate (P2) derived from said second filtration step (104).

8. Process according to one of claims 1 to 7, characterised in that at the end of the basic lixiviation step (101), the solubilisation of the sodium sulphate is comprised between 91 and 99%, preferably between 95 and 98%.

9. Process according to one of claims 1 to 8, characterised in that it comprises, before the first filtration step (103), a step (102) of treatment of the sodium sulphate solution (S) to remove solids therefrom.

10. Process according to claim 9, characterised in that said treatment step (102) comprises a step of centrifugation then filtration of the sodium sulphate solution.

11. Process according to one of claims 9 and 10, characterised in that at the end of said treatment, the sodium sulphate solution (S) has a solid content less than 1%, preferably less than or equal to 0.02%.

12. Process according to one of claims 1 to 11, characterised in that the step (105) of evaporation is carried out at a temperature comprised between 200°C and 250°C.

13. Process according to one of claims 1 to 12, characterised in that it comprises a step (106) of recycling of the chelating agent by precipitation of the metal complexes contained in the concentrate (C1, C2) obtained at the end of at least one filtration step (103, 104).