Claims

1. A method of preparing sodium aluminate:
   - mixing aluminium dross with sodium hydroxide in a ratio of 1:0.2 – 1:0.7 at a first pre-determined temperature to form a mixture, wherein the aluminium dross has an aluminium oxide content of ≥ 30% based on the total weight of the aluminium dross; and
   - filtering the mixture to obtain a first filtrate comprising sodium aluminate and a first residue.

2. The method according to claim 1, wherein the method further comprises diluting the first filtrate with water and mixing the first filtrate with carbon dioxide at a second pre-determined temperature to obtain aluminium trihydrate (ATH) residue and a second filtrate.

3. The method according to claim 1 or 2, wherein the aluminium dross has an aluminium oxide content of 60-90% based on the total weight of the aluminium dross.

4. The method according to any preceding claim, wherein the aluminium dross is powdered aluminium dross.

5. The method according to any preceding claim, wherein the aluminium dross has an average particle size of 0.002-10.0 mm.

6. The method according to any preceding claim, wherein the first pre-determined temperature is 50-100°C.

7. The method according to any of claims 2 to 6, wherein the diluting comprises diluting the first filtrate by a dilution factor of 1.5-4.

8. The method according to any of claims 2 to 7, wherein the mixing the first filtrate with carbon dioxide comprises flowing carbon dioxide into the first filtrate at a flowrate of 9-20 kg/min.

9. The method according to any of claims 2 to 8, wherein the second pre-determined temperature is 40-100°C.

10. The method according to any of claims 2 to 9, wherein the mixing the first filtrate with carbon dioxide comprises flowing carbon dioxide into the first filtrate for 60-180 minutes.

11. The method according to any of claims 2 to 10, wherein the mixing the first filtrate with carbon dioxide reduces pH of the first filtrate to 7.0-8.6.

12. The method according to any preceding claim, wherein the method is performed at atmospheric pressure.

13. The method according to any of claims 2 to 12, further comprising evaporating the second filtrate to form sodium bicarbonate.

14. The method according to claim 13, wherein the evaporating comprises vacuum evaporation.

15. The method according to claim 13 and 14, further comprising heating the sodium bicarbonate to form sodium carbonate.