CLAIMS

1. An adsorbent particle comprising iron oxyhydroxide having a β-type crystal structure as a main component, wherein 90% or more of the volume of the particle is constituted of a granular crystal having a crystal grain size of 20 nm or less or a columnar crystal having a width of 10 nm or less and a length of 30 nm or less and the particle has a BET specific surface area of 250 m^2/g or more.

2. The adsorbent particle according to claim 1, wherein the particle has a total pore volume of 0.18 mL/g or more.

3. The adsorbent particle according to claim 1 or 2, wherein a crystal grain can be observed using a transmission electron microscope without coagulation.

4. The adsorbent particle according to any one of claims 1 to 3, wherein a part of hydroxyl groups of the iron oxyhydroxide is substituted by a chloride ion.

5. The adsorbent particle according to any one of claims 1 to 4, wherein the adsorbent particle has an average particle diameter of 0.2 mm to 1.0 mm.

6. The adsorbent particle according to any one of claims 1 to 5, wherein the adsorbent particle has a true density of 3 g/cm^3 or more and a bulk density of 1.2 g/cm^3 or more.

7. The adsorbent particle according to any one of claims 1 to 6, wherein the adsorbent particle is an anion adsorbent.

8. The anion adsorbent particle according to claim 7, wherein the adsorbed amount in terms of phosphorus is 25 mg or more per g of the adsorbent after 24 hours in a batch adsorption test in which 1 g of the adsorbent is added to 150 mL of an aqueous solution of potassium dihydrogen phosphate adjusted to pH 3.5 with hydrochloric acid and having a concentration of 400 mg-P/L in terms of phosphorus, and the mixture is stirred at room temperature.

9. The anion adsorbent particle according to claim 7, wherein the adsorbed amount in terms of phosphorus is 20 mg or more per g of the adsorbent after 1 hour in a batch adsorption test in which 1 g of the adsorbent is added to 150 mL of an aqueous solution of potassium dihydrogen phosphate adjusted to pH 3.5 with hydrochloric acid and having a concentration of 400 mg-P/L in terms of phosphorus, and the mixture is stirred at room temperature.

10. The anion adsorbent particle according to claim 7, wherein, in a batch adsorption test in which 1 g of the adsorbent is added to 150 mL of an aqueous solution of potassium dihydrogen phosphate adjusted to pH 3.5 with hydrochloric acid and having a concentration of 400 mg-P/L in terms of phosphorus and the mixture is stirred at room temperature, the pH after 24 hours is increased by 0.5 or more from the pH after 1 hour.

11. The anion adsorbent particle according to any of claims 7 to 10,
wherein the adsorption particle has an adsorbed amount at breakthrough of 20 g-P/L or more per volume of the adsorbent packed, in a flow test in which an aqueous solution of potassium dihydrogen phosphate adjusted to pH 3 with hydrochloric acid and having a concentration of 100 mg-P/L in terms of phosphorus is passed through a column having an inner diameter of 26 mm φ packed with 20 g of the adsorbent at room temperature at a flow rate (SV) of 20 hr^{-1}.

12. The anion adsorbent according to claim 11, wherein the adsorption particle has an adsorbed amount at breakthrough of 10 g-P/L or more at a flow rate (SV) of 50 hr^{-1}.

13. A method for producing the adsorbent particle according to any one of claims 1 to 12, comprising the step of generating iron oxyhydroxide by adding a base represented by YOH (wherein Y represents a monovalent atom or atomic group) to a solution comprising at least one selected from trivalent iron compounds represented by FeX_3 (wherein X represents a monovalent atom or atomic group other than OH) while adjusting the pH to pH 3 to 6,
wherein a total concentration of FeX_3, YOH and other electrolytes is 10% by mass or more at the completion of the step.

14. A method for producing the adsorbent particle according to any one of claims 1 to 12, comprising the steps of:

generating iron oxyhydroxide by adding a base represented by YOH (wherein Y represents a monovalent atom or atomic group) to a solution comprising at least one selected from trivalent iron compounds represented by FeX_3 (wherein X represents a monovalent atom or atomic group other than OH) while adjusting the pH to pH 3 to 6; and

recovering the iron oxyhydroxide generated in the previous step in the form of a water-containing cake and drying the same,

wherein the water-containing cake is dried in the drying step in a state in which the cake comprises a total of 10% by mass or more of a by-product represented by YX (wherein X and Y are the same as the above) and other electrolytes on a dry basis.