**What is claimed is:**

[Claim 1] A preparation method of vinyl acetate by an ethylene process, comprising:

(a) a step of feeding non-condensable gas of an absorption tower gas-liquid separation tank into an ethylene recovery membrane assembly, and recovering ethylene from the non-condensable gas through membrane separation; the ethylene recovery membrane assembly (110) includes an aggregator and membrane equipment; the ethylene recovery membrane assembly (110) is used for controlling the content of inert components such as nitrogen in the circulating system and recovering ethylene gas from the non-condensable gas, so as to reduce losses caused by the fact that raw material ethylene is directly fed to be incinerated in the non-condensable gas; the aggregator in the membrane assembly has two effects that firstly, gas flows from bottom to top, and a demister in the aggregator can prevent water in the stream from flowing into the membrane equipment. Secondly, electric trace heating is arranged on a pipeline led out of the aggregator for heating, so that gas enters the membrane equipment after being overheated by 3-5℃, thereby preventing condensation caused by the fact that saturated gas directly makes contact with the membrane equipment;

(b) a step of feeding vinyl acetate containing a polymerization inhibitor and high-boiling-point impurities into a refined VAC tower, and drawing from a side of the refined VAC tower, to obtain a high-purity VAC product; and

(c) a step of allowing overhead vapour of an acetic acid tower and overhead vapour of a crude VAC tower to enter a distillation phase splitting tank after passing through an overhead condenser and a condensate cooler adopting circulating water series cooling and a tail gas condenser for cooling with chilled water respectively.

[Claim 2] The preparation method of vinyl acetate by the ethylene process according to claim 1, wherein in the step (a), the ethylene recovery membrane assembly (110) is additionally arranged between the absorption tower gas-liquid separation tank (107) and a flare.

[Claim 3] The preparation method of vinyl acetate by the ethylene process according to claim 1, wherein in the step (b), a side-draw stream is additionally added at third to seventh theoretical plates on an upper portion of the refined VAC tower.

[Claim 4] The preparation method of vinyl acetate by the ethylene process according to claim 1, wherein in the step (c), original respective and independent cooling of the overhead condenser and the condensate cooler is improved into a cooling method for cooling with the circulating water in series respectively on the top of the acetic acid tower (204) and the top of the crude VAC tower (210).

[Claim 5] The preparation method of vinyl acetate by the ethylene process according to claim 1, wherein refined gas from a synthesis and refining system is fed at the bottoms of the acetic acid tower (204) and an aldehydo-ester concentrating tower (221); one part of tower bottoms of the acetic acid tower (204) is fed to a synthesis section, and the other part thereof and the refined gas from the synthesis and refining system return to a lower portion of the acetic acid tower (204) after passing through an acetic tower reboiler (205); and one part of tower bottoms of the aldehydo-ester concentrating tower (221) and distillate of an extractive distillation tower phase splitting tank (237) return to the top of the crude VAC tower (210), and the other part thereof and the refined gas from the synthesis and refining system return to a lower portion of the aldehydo-ester concentrating tower (221) after passing through an aldehydo-ester concentrating tower reboiler (223).

[Claim 6] A device for realizing the preparation method of vinyl acetate by the ethylene process according to claim 1, wherein an ethylene recovery membrane assembly (110) comprises an aggregator and membrane equipment; a stream at an overhead outlet of an absorption tower gas-liquid separation tank (107) is divided into two streams connected with an inlet of the ethylene recovery membrane assembly (110) and a cooling side inlet of a refined gas heat exchanger (109) respectively; and an outlet of the ethylene recovery membrane assembly (110) is connected with a flare inlet and an inlet of a gas recovery compressor (112), respectively; wherein an overhead outlet of a refined VAC tower (211) is connected with a cooling side inlet of a refined VAC tower condenser (214), and a cooling side outlet of the refined VAC tower condenser (214) is connected with a cooling side inlet of a refined VAC tower condensate cooler (218); a cooling side outlet of the refined VAC tower condensate cooler (218) is connected with a refined VAC tower reflux tank (219); circulating water enters from a heating side inlet of the refined VAC tower condensate cooler (218), a heating side outlet of the refined VAC tower condensate cooler (218) is connected with a heating side inlet of the refined VAC tower condenser (214), and the circulating water exits from a heating side outlet of the refined VAC tower condenser (214); a side outlet of the

refined VAC tower (211) is connected with a cooling side inlet of a VAC product condenser (215), and a cooling side outlet of the VAC product condenser (215) is connected with a VAC product tank; chilled water enters from a heating side inlet of the VAC product condenser (215), and exits from a heating side outlet of the VAC product condenser (215); and a tower kettle outlet of the refined VAC tower (211) is connected with an upper end inlet of the acetic acid tower (204);

wherein an overhead outlet of an acetic acid tower (204) is connected with a cooling side inlet of an acetic acid tower condenser (206), and a cooling side outlet of the acetic acid tower condenser (206) is connected with a cooling side inlet of an acetic acid condenser cooler (208) and a cooling side inlet of an acetic acid tower tail gas condenser (209); a cooling side outlet of the acetic acid tower tail gas condenser (209) is connected with an inlet of a gas recovery compressor (112) and an inlet of an acetic acid tower distillation phase splitting tank (207); a cooling side outlet of the acetic acid tower condensate cooler (208) is connected with the inlet of the acetic acid tower distillation phase splitting tank (207); a circulating water inlet is connected with a heating side inlet of the acetic acid condenser cooler (208), a heating side outlet of the acetic acid condenser cooler (208) is connected with a heating side inlet of the acetic acid tower condenser (206), and a heating side outlet of the acetic acid tower condenser (206) is connected with a circulating water outlet; and a chilled water inlet is connected with a heating side inlet of the acetic acid tower tail gas condenser (209), and a heating side outlet of the acetic acid tower tail gas condenser (209) is connected with a chilled water outlet;

wherein an overhead outlet of a crude VAC tower (210) and an overhead outlet of a dehydrating tower (232) are both connected with a cooling side inlet of a crude VAC tower condenser (213), and a cooling side outlet of the crude VAC tower condenser (213) is connected with a cooling side inlet of a crude VAC tower condensate cooler (217) and a cooling side inlet of a crude VAC tower tail gas condenser (220); a cooling side outlet of the crude VAC tower tail gas condenser (220) is connected with an inlet of a gas recovery compressor (112) and an inlet of a crude VAC tower distillation phase splitting tank (216); a cooling side outlet of the crude VAC tower condensate cooler (217) is connected with the inlet of the crude VAC tower distillation phase splitting tank (216); a chilled water inlet is connected with a heating side inlet of the crude VAC tower tail gas condenser (220), and a heating side outlet of the crude VAC tower tail gas condenser (220) is connected with a chilled water outlet; and a circulating water inlet is connected with a heating side inlet of the crude VAC tower condensate cooler (217), a heating side outlet of the crude VAC tower

condensate cooler (217) is connected with a heating side inlet of the crude VAC tower condenser (213), and a heating side outlet of the crude VAC tower condenser (213) is connected with a circulating water outlet.