Claims

1. A propylene production method, comprising:

a reaction step of supplying a fresh raw material containing ethanol and acetone and a recycled raw material containing acetone to a reactor so that the fresh raw material and the recycled raw material react to obtain a crude product;

a gas-liquid separation step of separating the crude product into a gas phase containing propylene and a liquid phase containing acetone;

a propylene recovery step of recovering propylene from the gas phase; and

a recycling step of recovering the recycled raw material from the liquid phase,

wherein a molar ratio of a total amount of acetone to a total amount of ethanol which are contained in the fresh raw material and the recycled raw material is not less than 0.25 and not more than 1.7.

2. The propylene production method according to claim 1, wherein:

in the reaction step, a molar ratio of acetone contained in the fresh raw material supplied to the reactor to ethanol contained in the fresh raw material is 0.010 to 1.7.

3. The propylene production method according to claim 1 or 2, further comprising the steps of:

recovering, from the liquid phase, a low boiling point component having a boiling point lower than that of acetone; and

supplying the low boiling point component to at least one step selected from the group consisting of the reaction step, the gas-liquid separation step, and the recycling step.

4. The propylene production method according to claim 1 or 2, further comprising the steps of:

further recovering a condensed component containing acetone in the propylene recovery step; and

supplying the condensed component to at least one step selected from the group consisting of the reaction step, the gas-liquid separation step, and the recycling step.

5. The propylene production method according to any one of claims 1 through 4, wherein:

the recycled raw material contains ethanol and/or isopropanol.

6. The propylene production method according to any one of claims 1 through 5, further comprising:

a dehydration step of separating water from the crude product which has been obtained in the reaction step.

7. The propylene production method according to any one of claims 1 through 6, wherein:

in the reaction step, water is also supplied to the reactor.

8. The propylene production method according to claim 7, wherein:

an amount of the water supplied to the reactor in the reaction step is not less than 10 mol%, relative to a total amount of 100 mol% of ethanol and acetone which are supplied to the reactor.