Claims

[Claim 1] A process for producing acetic acid, which comprises
a reaction step for continuously allowing at least one member selected from the group consisting of methanol, dimethyl ether, and methyl acetate to react with carbon monoxide in a catalyst system comprising a rhodium catalyst, an iodide salt, and methyl iodide in the presence of acetic acid and water in a reactor,
a flash evaporation step for continuously feeding a flasher with a liquid reaction medium withdrawn from the reactor to separate a liquid stream and a vaporized stream from the liquid reaction medium, and
a distillation step for feeding a distillation column with the vaporized stream for obtaining a purified acetic acid,
wherein part of the vaporized stream is introduced into a heat exchanger for condensation, and a liquefied stream condensed by the heat exchanger is recycled to the reactor.

[Claim 2] A process according to claim 1, wherein 1 to 50% by weight of the vaporized stream is introduced into the heat exchanger.

[Claim 3] A process according to any one of claim 1 or 2, wherein an acetic acid stream obtained from the distillation step for purifying acetic acid is subjected to a further distillation and/or an adsorption treatment for obtaining a further purified acetic acid.

[Claim 4] A process according to any one of claims 1 to 3, wherein the liquid stream separated by the flasher is introduced into the heat exchanger and cooled, and then the cooled stream is recycled to the reactor.

[Claim 5] A process according to any one of claims 1 to 4, wherein each of a gaseous component from the reactor and an overhead fraction from the distillation column is condensed by a condenser.

[Claim 6] A process according to any one of claims 1 to 5, wherein the reactor is a reactor without a heat-removable or cooling unit.

[Claim 7] A process according to any one of claims 1 to 6, wherein, in the reaction step, the reaction is conducted while maintaining the reaction system at concentrations of the iodide salt of 2 to 25% by weight, methyl iodide of 1 to 20% by weight, methyl acetate of 0.1 to 30% by weight, and water of 0.1 to 10% by weight in a whole liquid phase of the reaction system.

[Claim 8] A process according to claim 7, wherein the concentration of the iodide salt is 6 to 25% by weight, and the concentration of water is 0.1 to 6%

by weight.

[Claim 9] A method for controlling a temperature in a production process of acetic acid, which comprises

a reaction step for continuously allowing at least one member selected from the group consisting of methanol, dimethyl ether, and methyl acetate to react with carbon monoxide in a catalyst system comprising a rhodium catalyst, an iodide salt, and methyl iodide in the presence of acetic acid and water,

a flash evaporation step for continuously withdrawing a liquid reaction medium from the reaction step to separate a liquid stream and a vaporized stream from the liquid reaction medium, and

a distillation step for distilling the vaporized stream for obtaining a purified acetic acid,

wherein part of the vaporized stream is introduced into a heat exchanger for condensation, and a liquefied stream condensed by the heat exchanger is recycled to the reaction step.

CLAIMS

1. A process for producing acetic acid, which comprises

a reaction step for continuously allowing at least one member selected from the group consisting of methanol, dimethyl ether, and methyl acetate to react with carbon monoxide in a catalyst system comprising a rhodium catalyst, an iodide salt, and methyl iodide in the presence of acetic acid and water in a reactor,

a flash evaporation step for continuously feeding a flasher with a liquid reaction medium withdrawn from the reactor to separate a liquid stream and a vaporized stream from the liquid reaction medium, and

a distillation step for feeding a distillation column with the vaporized stream for obtaining a purified acetic acid,

wherein part of the vaporized stream is introduced into a heat exchanger for condensation, and a liquefied stream condensed by the heat exchanger is recycled to the reactor.

2. A process according to claim **1**, wherein 1 to 50% by weight of the vaporized stream is introduced into the heat exchanger.

3. A process according to any one of claim **1** or **2**, wherein an acetic acid stream obtained from the distillation step for purifying acetic acid is subjected to a further distillation and/or an adsorption treatment for obtaining a further purified acetic acid.

4. A process according to claim **1**, wherein the liquid stream separated by the flasher is introduced into the heat exchanger and cooled, and then the cooled stream is recycled to the reactor.

5. A process according to claim **1**, wherein each of a gaseous component from the reactor and an overhead fraction from the distillation column is condensed by a condenser.

6. A process according to claim **1**, wherein the reactor is a reactor without a heat-removable or cooling unit.

7. A process according to claim **1**, wherein, in the reaction step, the reaction is conducted while maintaining the reaction system at concentrations of the iodide salt of 2 to 25% by weight, methyl iodide of 1 to 20% by weight, methyl acetate of 0.1 to 30% by weight, and water of 0.1 to 10% by weight in a whole liquid phase of the reaction system.

8. A process according to claim **7**, wherein the concentration of the iodide salt is 6 to 25% by weight, and the concentration of water is 0.1 to 6% by weight.

9. A method for controlling a temperature in a production process of acetic acid, which comprises

a reaction step for continuously allowing at least one member selected from the group consisting of methanol, dimethyl ether, and methyl acetate to react with carbon monoxide in a catalyst system comprising a rhodium catalyst, an iodide salt, and methyl iodide in the presence of acetic acid and water,

a flash evaporation step for continuously withdrawing a liquid reaction medium from the reaction step to separate a liquid stream and a vaporized stream from the liquid reaction medium, and

a distillation step for distilling the vaporized stream for obtaining a purified acetic acid,

wherein part of the vaporized stream is introduced into a heat exchanger for condensation, and a liquefied stream condensed by the heat exchanger is recycled to the reaction step.

10. A process according to claim **2**, wherein a residual part of the vaporized stream is introduced into the distillation step.