We claim:

1. A process for producing acetic acid comprising:

carbonylating at least one member selected from the group consisting of methanol, dimethyl ether, and methyl acetate in a reaction medium comprising a rhodium catalyst, water, methyl iodide and lithium-containing compounds;

separating the reaction medium into a liquid recycle stream and a vapor product stream comprising acetic acid;

distilling the vapor product stream in a first column to form an overhead and a crude product stream comprising acetic acid;

distilling the crude product stream in a second column to form a vapor sidedraw comprising acetic acid and lithium-containing compounds at a concentration of no more than 100 wppb, and a bottoms stream enriched in lithium-containing compounds;

condensing the vapor sidedraw to form a condensed sidedraw; and

feeding the condensed sidedraw to a metal-exchanged ion exchange resin having acid cation exchange sites to produce purified acetic acid.

2. The process of claim 1, wherein the lithium-containing compounds comprise lithium iodide, lithium hydroxide, lithium acetate, lithium acetate dihydrate, lithium carbonate, lithium alkyl carbonate, methyllithium, lithium chloride, lithium oxalate or mixtures thereof.

3. The process of claim 1, wherein the condensed sidedraw has a temperature of greater than 25°C.

4. The process of claim 1, wherein the bottoms stream comprises lithium-containing compounds at a concentration of greater than 100 wppb.

5. The process of claim 1, wherein the bottoms stream comprises lithium-

containing compounds at a concentration of no more than 10 wppm.

6. The process of claim 1, wherein the bottoms stream further comprises a carbonyl-group containing impurity having a boiling point higher than acetic acid.

7. The process of claim 6, wherein the carbonyl-group containing impurity having a boiling point higher than acetic acid is present in an concentration of greater than or equal to 10 wt.%.

8. The process of claim 6, wherein the bottoms stream further comprises acetic acid in an concentration of no more than 50 wt.%.

9. The process of claim 6, wherein the bottoms stream further comprises water in an concentration of no more than 0.1 wt.%.

10. The process of claim 1, wherein the condensed sidedraw comprises the lithium-containing compounds at a concentration from 1 to 100 wppb.

11. The process of claim 1, wherein the condensed sidedraw comprises acetic acid in an concentration of greater than or equal to 99.5 wt.%.

12. The process of claim 1, wherein the condensed sidedraw comprises water in an concentration of no more than 0.2 wt.%.

13. The process of claim 1, wherein the purified acetic acid has a displaced metal concentration of no more than 2000 wppb, wherein the displaced metals are selected from the group consisting of silver and mercury.

14. The process of claim 1, wherein the purified acetic acid comprises iodides at a

concentration of no more than 100 wppb.

15. The process of claim 1, wherein the vapor sidedraw is withdrawn at a point within 5 actual stages from the base of the second column.

16. The process of claim 1, wherein the first or the second column has an inner pressure from 0.01 to 0.7 MPa.

17. The process of claim 1, wherein the temperature in the first column is about 50 to 150°C.

18. The process of claim 1, wherein the metal-exchanged ion exchange resin has a proportion of the active sites exchanged to metal from 10 to 80% by mol.

19. The process of claim 1, wherein the condensed sidedraw comprises iron at a concentration of no more than 1.5 wppm, chloride at a concentration of no more than 0.5 wppm, and formic acid at a concentration of no more than 0.01 wppm.

20. The process of claim 1, wherein the condensed sidedraw is directly fed to the metal-exchanged ion exchange resin.