CLAIMS

What is claimed is:

1. A process for producing acetic acid comprising:
    a) combining methanol, methyl acetate or any mixture of the two, and carbon monoxide in the presence of a reaction mixture comprising:
        i) a carbonylation catalyst selected from rhodium catalysts, iridium catalysts, palladium catalysts, and cobalt catalysts;
        ii) water in the range of from 0.1 wt% to 10 wt%, based on the weight of the reaction mixture; and
        iii) one or more promoters selected from the group consisting of Group I and Group II aminopolycarboxylate salts and mixtures thereof; and
        iv) iodide; and
    b) recovering acetic acid.
2. The process of claim 1, wherein the aminopolycarboxylate salts comprise 2 or more carboxylate groups.
3. The process of claim 1, wherein the aminopolycarboxylate salts comprise at least one amine group and at least 3 carboxylate groups.
4. The process of claim 1, wherein the one or more promoters is continually added to the reaction mixture as an acetic acid solution.
5. The process of claim 1, wherein the process takes place in an acetic acid system comprising a reaction area, a light-ends area, a purification area, and a recycle area, wherein the reaction area comprises a reactor and a flash vessel.
6. The process of claim 5, wherein the one or more promoters are added to the flash vessel.
7. The process of claim 1, wherein the combining takes place in the reactor at a temperature within the range of about 120°C to about 250°C and a pressure within the range of about 200 psia (1.38 MPa-a) to 2,000 psia (13.8 MPa-a).
8. The process of claim 1, wherein the one or more promoters are maintained at an iodide to promoter molar ratio of 2:1 to 40:1.
9. The process of claim 1, wherein the one or more promoters are maintained at a promoter to carbonylation catalyst molar ratio of 0.005:1 to 4:1.
10. The process of claim 8, wherein as the molar ratio of the one or more promoters is

increased the wt% of water can be decreased.

11. The process of claim 1, wherein salts of salts of glutamate and dicarboxymethyl alaninate are absent.

12. A method for reducing water in an acetic acid production process comprising:

a) combining methanol, methyl acetate or any mixture of the two, and carbon monoxide in the presence of a reaction mixture comprising iodide under carbonylation conditions sufficient to form acetic acid at a first rate, wherein the reaction mixture comprises:

i) a carbonylation catalyst, selected from the group consisting of rhodium catalysts, iridium catalysts, palladium catalysts, and cobalt catalysts; and

ii) a first amount of water, where the water is present in the range of from 0.1 wt% to 10 wt%, based on the weight of the reaction mixture; and

b) combining one or more promoters to the reaction mixture at an iodide to promoter molar ratio of greater than 2, wherein the one or more promoters are selected from the group consisting of Group I and Group II aminopolycarboxylate salts and mixtures thereof; and

c) reducing the wt% of water in the reaction mixture to a second amount of water while maintaining a second rate of acetic acid production that is the same as or greater than the first rate of acetic acid production.

13. The process of claim 12, wherein the aminopolycarboxylate salts comprise 2 to 10 carboxylate groups.

14. The process of claim 12, wherein the aminopolycarboxylate salts comprise at least 2 amine groups and at least 2 carboxylate groups.

15. The process of claim 12, wherein the iodide is in the form of HI, CH_3I, or both.

16. The process of claim 12, wherein the one or more promoters is continually added to the reaction mixture as an acetic acid solution.

17. The process of claim 9, wherein the combining takes place in the reactor at a temperature within the range of about 120°C to about 250°C and a pressure within the range of about 200 psia (1.38 MPa-a) to 2,000 psia (13.8 MPa-a).

18. The process of claim 12, wherein the one or more promoters are maintained at an iodide to promoter molar ratio of 2:1 to 40:1.

19. The process of claim 12, wherein the one or more promoters are maintained at a promoter to carbonylation catalyst molar ratio of 0.005:1 to 4:1.

20. The process of claim 12, salts of glutamate and dicarboxymethyl alaninate are absent.