CLAIMS

WE CLAIM:

1. A process for producing acetic acid comprising:
   (i) producing acetic acid in a reactor, wherein the producing step includes a reaction comprising carbon monoxide and methanol in the presence of a catalyst;
   (ii) obtaining hydrogen iodide in an acetic acid production system; and
   (iii) continually introducing a complexing agent into the system downstream of the reactor,
   wherein the complexing agent comprises a phosphine oxide, and
   wherein the phosphine oxide and hydrogen iodide interact to form a complex.

2. The process of claim 1 wherein the complexing agent is continually introduced as an acetic acid solution.
3. The process of claim 1 wherein the complexing agent comprises a catalyst stabilizer.
4. The process of claim 3 wherein the catalyst stabilizer comprises triphenylphosphine oxide.
5. The process of claim 1 wherein the complexing agent is introduced upstream of the purification area.
6. The process of claim 1 wherein the phosphine oxide is triphenylphosphine oxide.
7. The process of claim 1 wherein the acetic acid production system comprises a drying column, the process further comprising continually introducing the complexing agent upstream of the drying column.
8. The process of claim 1 wherein the acetic acid production system comprises a reactor, the process further comprising continually introducing the complexing agent into the reactor.
9. The process of claim 1 wherein the acetic acid production system comprises a reactor and a stream in fluid communication with the reactor, the process further comprising continually introducing the complexing agent into the stream.
10. The process of claim 1 wherein the acetic acid production system comprises a flash vessel, the process further comprising continually introducing the complexing agent into the flash vessel.

11. The process of claim 1 wherein the acetic acid production system comprises a flash vessel and a stream in fluid communication with the flash vessel, the process further comprising continually introducing the complexing agent into the stream.
12. The process of claim 1 wherein the acetic acid production system comprises a light-ends column, the process further comprising continually introducing the complexing agent into the light-ends column.
13. The process of claim 1 wherein the acetic acid production system comprises a light-ends column and a stream in fluid communication with the light-ends column, the process further comprising continually introducing the complexing agent into the stream.
14. The process of claim 1 wherein the acetic acid production system comprises a drying column, the process further comprising continually introducing the complexing agent into the drying column.

CLAIMS

1. A process for producing acetic acid in an acetic acid production system comprising the steps of:

(i) producing acetic acid in a reactor, wherein the producing step includes a reaction comprising carbon monoxide and methanol in the presence of a catalyst and hydrogen iodide;

(ii) forming a complex downstream of the reactor by continually introducing a complexing agent into the system downstream of the reactor, wherein the complexing agent comprises a phosphine oxide, wherein the complexing agent is introduced in an amount from about 0.1 to 10 mol per mol of hydrogen iodide, and wherein the phosphine oxide and hydrogen iodide interact to form the complex, and

(iii) recovering the complex, wherein the catalyst comprises a rhodium catalyst or an iridium catalyst.

2. The process of claim 1 wherein the complexing agent is continually introduced as an acetic acid solution.

3. The process of claim 1 wherein the complexing agent comprises a catalyst stabilizer.

4. The process of claim 3 wherein the catalyst stabilizer comprises triphenylphosphine oxide.

5. The process of claim 1 wherein the complexing agent is introduced upstream of the purification area.

6. The process of claim 1 wherein the phosphine oxide is triphenylphosphine oxide.

7. The process of claim 1 wherein the acetic acid production system comprises a drying column, the process further comprising continually introducing the complexing agent upstream of the drying column.

8. The process of claim 1 wherein the acetic acid production system comprises a reactor, the process further comprising continually introducing the complexing agent into the reactor.

9. The process of claim 1 wherein the acetic acid production system comprises a reactor and a stream in fluid communication with the reactor, the process further comprising continually introducing the complexing agent into the stream.

10. The process of claim 1 wherein the acetic acid production system comprises a flash vessel, the process further comprising continually introducing the complexing agent into the flash vessel.

11. The process of claim 1 wherein the acetic acid production system comprises a flash vessel and a stream in fluid communication with the flash vessel, the process further comprising continually introducing the complexing agent into the stream.

12. The process of claim 1 wherein the acetic acid production system comprises a light-ends column, the process further comprising continually introducing the complexing agent into the light-ends column.

13. The process of claim 1 wherein the acetic acid production system comprises a light-ends column and a stream in fluid communication with the light-ends column, the process further comprising continually introducing the complexing agent into the stream.

14. The process of claim 1 wherein the acetic acid production system comprises a drying column, the process further comprising continually introducing the complexing agent into the drying column.

15. The process of claim 1 wherein the acetic acid production system comprises a drying column and a stream in fluid communication with the drying column, the process further comprising continually introducing the complexing agent into the stream.

16. The process of claim 1 wherein the acetic acid production system comprises a recycle stream, the process further comprising continually introducing the complexing agent into the recycle stream.

17. The process of claim 1 wherein acetic acid production system comprises a reaction mixture comprising water in a concentration of from about 0.2% to about 10% by weight.

18. The process of claim 1 wherein the complexing agent is introduced into the system in an amount based upon a rate of attrition of the complexing agent from a reactor in the system.