

CLAIMS

The invention claimed is:

1. A method comprising:
reacting ethylene, oxygen, and acetic acid in the presence of a catalyst and optionally a catalyst promotor like sodium acetate and/or potassium acetate to yield a crude vinyl acetate stream;
measuring a concentration of a metal ion of the crude vinyl acetate stream and/or a stream downstream thereof with an ion chromatograph, wherein the metal ion is selected from the group consisting of Group I metal ions, Group II metal ions, transition metal ions, and any combination thereof.
2. The method of claim 1, wherein the ion chromatograph is in-line with a stream of the crude vinyl acetate stream and/or the stream downstream.
3. The method of any preceding claim further comprising:
condensing the crude vinyl acetate stream and/or the stream downstream before measuring the concentration of the metal ion.
4. The method of any preceding claim, wherein measuring continues over time at intervals ranging from about 1 minute to about 6 hours.
5. The method of any preceding claim, wherein the ion chromatograph uses a column comprising particles that can simultaneously analyze for monovalent and divalent cations.
6. The method of any preceding claim, wherein the ion chromatograph comprise a detector selected from the group consisting of a conductivity detector, an electrochemical detector, a UV/VIS detector, a fluorescence detector, and any combination thereof.
7. The method of any preceding claim, wherein the metal ion is selected from the group consisting of sodium ion, potassium ion, magnesium ion, cesium ion, iron ion, nickel ion, and any combination thereof.
8. A system comprising:

a reactor that contains a catalyst and that receives ethylene, oxygen, and acetic acid to produce a crude vinyl acetate stream;

a heat exchanger that is downstream of the reactor; and

an ion chromatograph that is in-line with the crude vinyl acetate stream, that is downstream of the heat exchanger, and that receives a sample from the crude vinyl acetate stream, wherein the ion chromatograph comprises a column capable of measure, in the crude vinyl acetate stream, a concentration of a metal ion selected from the group consisting of Group I metal ions, Group II metal ions, transition metal ions, and any combination thereof.

9. The system of claim 8, wherein the ion chromatograph uses a column comprising particles that can simultaneously analyze for monovalent and divalent cations.

10. The system of claim 8 or 9, wherein the ion chromatograph comprise a detector selected from the group consisting of a conductivity detector, an electrochemical detector, a UV/VIS detector, a fluorescence detector, and any combination thereof.

11. The system of claim 8 or 9 or 10, wherein the metal ion is selected from the group consisting of sodium ion, potassium ion, magnesium ion, cesium ion, iron ion, nickel ion, and any combination thereof.

12. A system comprising:

a reactor that contains a catalyst and that receives ethylene, oxygen, and acetic acid to produce a crude vinyl acetate stream;

a heat exchanger that is downstream of the reactor;

a separator that is downstream of the heat exchanger, that receives the crude vinyl acetate stream, and that separates the crude vinyl acetate stream into an overheads stream and a bottoms stream; and

an ion chromatograph that is in-line with the bottoms stream and that receives a sample from the bottoms stream, wherein the ion chromatograph comprises a column capable of measure, in the bottoms stream, a concentration of a metal ion selected from the group consisting of Group I metal ions, Group II metal ions, transition metal ions, and any combination thereof.

13. The system of claim 12, wherein the ion chromatograph uses a column comprising particles that can simultaneously analyze for monovalent and divalent cations.

14. The system of claim 12 or 13, wherein the ion chromatograph comprise a detector selected from the group consisting of a conductivity detector, an electrochemical detector, a UV/VIS detector, a fluorescence detector, and any combination thereof.

15. The system of claim 12 or 13 or 14, wherein the metal ion is selected from the group consisting of sodium ion, potassium ion, magnesium ion, cesium ion, iron ion, nickel ion, and any combination thereof.