We claim:

1. A process for producing ethanol, comprising the steps of:

introducing acetic acid into a vaporizer to form a vapor feed stream and a blowdown stream having a weight ratio of the vapor feed stream to the blowdown stream of at least 2:1;

introducing the vapor feed stream into a reactor; and

hydrogenating acetic acid from the vapor feed stream in the presence of a catalyst to form a crude ethanol product comprising ethanol.

2. The process of claim 1, wherein the reactor is operated at an operating pressure from 10 KPa to 3000 KPa, and the acetic acid is vaporized at a temperature below the acetic acid's boiling point at the operating pressure.

3. The process as in any one of claims 1 and 2, wherein the vapor feed stream temperature is less than 160°C.

4. The process as in one of claims 1-3, wherein acetic acid is fed to an upper portion of the vaporizer.

5. The process as in one of claims 1-4, wherein hydrogen is fed to a lower portion of the vaporizer.

6. The process as in one of claims 1-5, wherein the weight ratio of the vapor feed stream to the blowdown stream is at least 10:1.

7. The process as in one of claims 1-6, wherein the blowdown stream comprises at least 85 wt.% acetic acid and less than 1 wt.% of compounds having a boiling point higher than acetic acid.

8. The process as in one of claims 1-7, further comprising separating the crude ethanol product in one or more distillation columns into an ethanol stream and at least one recycle stream.

9. The process as in one of claims 1-8, wherein at least a portion of the at least one recycle stream is introduced into the vaporizer.

10. The process as in one of claims 1-9, wherein the at least one recycle stream comprises acetic acid and less than 1 wt. % compounds having a boiling point higher than acetic acid.

11. The process as in one of claims 1-10, wherein the vapor feed stream comprises at least 70 wt.% acetic acid, based on the total weight of the vapor feed stream.

12. The process as in one of claims 1-11, wherein the catalyst comprises a combination of metals selected from the group consisting of platinum/tin, platinum/ruthenium, platinum/rhenium, palladium/ruthenium, palladium/rhenium, cobalt/palladium, cobalt/platinum, cobalt/chromium, cobalt/ruthenium, silver/palladium, copper/palladium, nickel/palladium, gold/palladium, ruthenium/rhenium, and ruthenium/iron.

13. The process as in one of claims 1-12, wherein the vaporizer is constructed of stainless steel.

14. A process for producing ethanol, comprising the steps of:

introducing acetic acid in a vaporizer to form a vapor feed stream;

introducing the vapor feed stream into a reactor;

hydrogenating acetic acid from the vapor feed stream in the presence of a catalyst to form a crude ethanol product comprising ethanol; and

separating ethanol and at least one recycle stream from the crude ethanol product, wherein the at least one recycle stream comprises acetic acid and less than 1.0 wt. % compounds having a boiling point higher than acetic acid, and wherein the at least one recycle stream is introduced to the vaporizer along with acetic acid to form the vapor feed stream.

15. The process of claim 14, wherein the reactor is operated at an operating pressure from 10 KPa to 3000 KPa, and the acetic acid is vaporized at a temperature below the acetic acid's boiling point at the operating pressure.

16. The process as in any one of claims 14 and 15, wherein the temperature of the vapor feed stream is less than 160°C.

17. The process as in one of claims 14-16, further comprising removing a blowdown stream from the vaporizer, wherein the blowdown stream comprises at least 85 wt.% acetic acid and less than 1 wt.% of compounds having a boiling point higher than acetic acid.

18. The process as in one of claims 14-17, wherein a weight ratio of the vapor feed stream to the blowdown stream is at least 2:1.

19. The process as in one of claims 14-17, wherein the vapor feed stream comprises at least 70 wt.% acetic acid, based on the total weight of the vapor feed stream.

20. The process as in one of claims 14-17, wherein the vaporizer is constructed of stainless steel.

21. A process for producing ethanol, comprising the steps of:

vaporizing acetic acid in a vaporizer in the presence of hydrogen to form a vapor feed stream comprising vaporized acetic acid;

introducing the vapor feed stream into a reactor; and

hydrogenating the vaporized acetic acid at an operating pressure of the reactor and in the presence of a catalyst to form a crude ethanol product comprising ethanol, wherein the acetic acid is vaporized at a temperature below acetic acid's boiling point at the operating pressure of the reactor.

22. The process of claim 21, wherein the operating pressure of the reactor is from 10 KPa to 3000 KPa.

23. The process as in any one of claims 21 and 22, wherein the temperature of the vapor feed stream is less than 160°C.

24. The process as in one of claims 21-23, further comprising removing a blowdown stream from the vaporizer, wherein the blowdown stream comprises at least 85 wt.% acetic acid and less than 1 wt.% of compounds having a boiling point higher than acetic acid.

25. The process of claim 24, wherein a weight ratio of the vapor feed stream to the blowdown stream is at least 2:1.

26. The process as in one of claims 21-25, wherein the vaporizer is constructed of stainless steel.

We claim:

1. A process for producing ethanol, comprising the steps of:

introducing acetic acid into a vaporizer to form a vapor feed stream and a blowdown stream having a weight ratio of the vapor feed stream to the blowdown stream of at least 2:1, and wherein the blowdown stream comprises at least 85 wt. % acetic acid;

introducing the vapor feed stream into a reactor; and hydrogenating acetic acid from the vapor feed stream in the presence of a catalyst to form a crude ethanol product comprising ethanol.

2. The process of claim 1, wherein the reactor is operated at an operating pressure from 10 KPa to 3000 KPa, and the acetic acid is vaporized at a temperature below the acetic acid's boiling point at the operating pressure.

3. The process of claim 1, wherein the vapor feed stream temperature is less than 160°C.

4. The process of claim 1, wherein acetic acid is fed to an upper portion of the vaporizer.

5. The process of claim 1, wherein hydrogen is fed to a lower portion of the vaporizer.

6. The process of claim 1, wherein the weight ratio of the vapor feed stream to the blowdown stream is at least 10:1.

7. The process of claim 6, wherein the blowdown stream comprises less than 1 wt. % of compounds having a boiling point higher than acetic acid.

8. The process of claim 1, further comprising separating the crude ethanol product in one or more distillation columns into an ethanol stream and at least one recycle stream.

9. The process of claim 8, wherein at least a portion of the at least one recycle stream is introduced into the vaporizer.

10. The process of claim 9, wherein the at least one recycle stream comprises acetic acid and less than 1 wt. % compounds having a boiling point higher than acetic acid.

11. The process of claim 1, wherein the vapor feed stream comprises at least 70 wt. % acetic acid, based on the total weight of the vapor feed stream.

12. The process of claim 1, wherein the catalyst comprises a combination of metals selected from the group consisting of platinum/tin, platinum/ruthenium, platinum/rhenium, palladium/ruthenium, palladium/rhenium, cobalt/palladium, cobalt/platinum, cobalt/chromium, cobalt/ruthenium, silver/palladium, copper/palladium, nickel/palladium, gold/palladium, ruthenium/rhenium, and ruthenium/iron.

13. The process of claim 1, wherein the vaporizer is constructed of stainless steel.

14. A process for producing ethanol, comprising the steps of: introducing acetic acid in a vaporizer to form a vapor feed stream; introducing the vapor feed stream into a reactor; hydrogenating acetic acid from the vapor feed stream in the presence of a catalyst to form a crude ethanol product comprising ethanol; and separating ethanol and at least one recycle stream from the crude ethanol product, wherein the at least one recycle stream comprises acetic acid and less than 1.0 wt. % compounds having a boiling point higher than acetic acid, and wherein the at least one recycle stream is

introduced to the vaporizer along with acetic acid to form the vapor feed stream.

15. The process of claim 14, wherein the reactor is operated at an operating pressure from 10 KPa to 3000 KPa, and the acetic acid is vaporized at a temperature below the acetic acid's boiling point at the operating pressure.

16. The process of claim 14, wherein the temperature of the vapor feed stream is less than 160°C.

17. The process of claim 14, further comprising removing a blowdown stream from the vaporizer, wherein the blowdown stream comprises at least 85 wt. % acetic acid and less than 1 wt. % of compounds having a boiling point higher than acetic acid.

18. The process of claim 17, wherein a weight ratio of the vapor feed stream to the blowdown stream is at least 2:1.

19. The process of claim 14, wherein the vapor feed stream comprises at least 70 wt. % acetic acid, based on the total weight of the vapor feed stream.

20. The process of claim 14, wherein the vaporizer is constructed of stainless steel.

21. A process for producing ethanol, comprising the steps of:

vaporizing acetic acid in a vaporizer in the presence of hydrogen to form a vapor feed stream comprising vaporized acetic acid;

introducing the vapor feed stream into a reactor; and hydrogenating the vaporized acetic acid at an operating pressure of the reactor and in the presence of a catalyst to form a crude ethanol product comprising ethanol, wherein the acetic acid is vaporized at a temperature below acetic acid's boiling point at the operating pressure of the reactor.

22. The process of claim 21, wherein the operating pressure of the reactor is from 10 KPa to 3000 KPa.

23. The process of claim 21, wherein the temperature of the vapor feed stream is less than 160°C.

24. The process of claim 21, further comprising removing a blowdown stream from the vaporizer, wherein the blowdown stream comprises at least 85 wt. % acetic acid and less than 1 wt. % of compounds having a boiling point higher than acetic acid.

25. The process of claim 24, wherein a weight ratio of the vapor feed stream to the blowdown stream is at least 2:1.

26. The process of claim 21, wherein the vaporizer is constructed of stainless steel.