WHAT IS CLAIMED IS:

1. A semi-continuous process for selective formation of vinyl ester from its corresponding carboxylic acid, the process comprising:

(a) providing a carboxylic acid, vinyl acetate, and a homogeneous transvinylation catalyst to a reaction mixture;

(b) reacting the carboxylic acid and vinyl acetate in the presence of the homogeneous transvinylation catalyst in the reaction mixture to form a vinyl ester product and acetic acid;

(c) continuously removing acetic acid and vinyl acetate from the reaction mixture;

(d) separating at least a portion of the removed vinyl acetate from the removed acetic acid and recycling the separated vinyl acetate to the reaction mixture;

(e) withdrawing reaction mixture as a crude vinyl ester product mixture which includes residual carboxylic acid, residual vinyl acetate, residual acetic acid, and homogeneous transvinylation catalyst; and

(f) separatin g residual carboxylic acid, residual vinyl acetate, residual acetic acid, and homogeneous transvinylation catalyst from the crude vinyl ester product mixture to form a purified vinyl ester product;

wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at

least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture.

2. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that a molar ratio of vinyl acetate:carboxylic acid of from 1:1 to 9:1 maintained in the reaction mixture.

3. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that the process is characterized by an Hourly Catalytic Productivity of at least 0.05 kg vinyl product per gm catalyst metal per hour.

4. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that the process is characterized by an Hourly Catalytic Productivity of at least 0.1 kg vinyl product per gm catalyst metal per hour.

5. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that the process is characterized by an Hourly Catalytic Productivity of from about 0.1 to about 0.4 kg vinyl product per gm catalyst metal per hour.

6. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 10 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of from 1:1 to 9:1 maintained in the reaction mixture.

7. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 5 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of from 1:1 to 9:1 maintained in the reaction mixture.

8. The process according to Claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of from about 1.5:1 up to about 4:1 maintained in the reaction mixture.

9. The process according to Claim 7, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15

weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of more than 2:1 is maintained in the reaction mixture.

10. The process according to Claim 1, wherein the reaction time for the process is from about 2 hours to about 20 hours.

11. The process according to Claim 1, wherein the separated vinyl acetate is recycled at a rate of less than 8 kg of vinyl acetate for every kg of vinyl ester produced.

12. The process according to Claim 1, wherein the carboxylic acid is selected from the group consisting of 2-ethylhexanoic acid, benzoic acid, neodecanoic acid, propionic acid, butyric acid, valeric acid, heptanoic acid, acrylic acid, methacrylic acid, stearic acid, and palmitic acid.

13. The process according to Claim 1, wherein the homogeneous transvinylation catalyst comprises a platinum group metal.

14. A semi-continuous process for selective formation of vinyl ester by reactive distillation from its corresponding carboxylic acid, the process comprising:

(a) providing carboxylic acid, vinyl acetate, and a palladium acetate – bidentate ligand catalyst complex to a reaction mixture;

(b) reacting the carboxylic acid and vinyl acetate in the presence of the palladium acetate – bidentate ligand catalyst complex in the reaction mixture to form a vinyl ester product and acetic acid;

(c) continuously removing acetic acid and vinyl acetate from the reaction mixture;

(d) separating at least a portion of the removed vinyl acetate from the removed acetic acid and recycling the separated vinyl acetate to the reaction mixture;

(e) withdrawing reaction mixture as a crude vinyl ester product mixture which includes residual carboxylic acid, residual vinyl acetate, residual acetic acid, and palladium acetate – bidentate ligand catalyst complex; and

(f) separatin g residual carboxylic acid, residual vinyl acetate, residual acetic acid, and palladium acetate – bidentate ligand catalyst complex from the crude vinyl ester product mixture to form a purified vinyl ester product;

wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture.

15. A semi-continuous process for selective formation of vinyl ester from neodecanoic acid, the process comprising:

(a) purifying raw neodecanoic acid;

(b) reacting the purified neodecanoic acid and vinyl acetate in the presence of a homogeneous transvinylation catalyst in a reaction mixture to form a vinyl ester product and acetic acid;

(c) continuously removing acetic acid and vinyl acetate from the reaction mixture and recycling at least a portion of the vinyl acetate to the reaction mixture;

(d) withdrawing the reaction mixture and separating vinyl neodecanoate product from the reaction mixture;

wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that neodecanoic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture.

16. A process for purifying a carboxylic acid, wherein the raw carboxylic acid is purified using a method selected from the group consisting of flash distillation; fractionation; extraction; hydrogenation; and combinations thereof;
wherein the purification process is operated under conditions selected such that the purified carboxylic acid contains less than 1 weight % impurities selected from the group consisting of compounds having alcohol functional groups; compounds having ester functional groups; compounds having olefinic functional groups; compounds having peroxide functional groups; sulfur; and other electropositive metals.

What is claimed is:

1. A semi-continuous process for selective formation of vinyl ester from its corresponding carboxylic acid, the process comprising: (a) providing a carboxylic acid, vinyl acetate, and a homogeneous transvinylation catalyst comprising palladium to a reaction mixture; (b) reacting the carboxylic acid and vinyl acetate in the presence of the homogeneous transvinylation catalyst comprising palladium in the reaction mixture to form a vinyl ester product and acetic acid; (c) continuously removing acetic acid and vinyl acetate from the reaction mixture in a molar ratio of vinyl acetate:acetic acid of 0.5:1 to 14.4:1; (d) separating at least a portion of the removed vinyl acetate from the removed acetic acid and recycling the separated vinyl acetate to the reaction mixture; (e) withdrawing reaction mixture as a crude vinyl ester product mixture which includes residual carboxylic acid, residual vinyl acetate, residual acetic acid, and homogeneous transvinylation catalyst; and (f) separating residual carboxylic acid, residual vinyl acetate, residual acetic acid, and homogeneous transvinylation catalyst from the crude vinyl ester product mixture to form a purified vinyl ester product; wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture.

2. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that a molar ratio of vinyl acetate:carboxylic acid of from 1:1 to 9:1 is maintained in the reaction mixture.

3. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that the process is characterized by an Hourly Catalytic Productivity of at least 0.05 kg vinyl product per gm catalyst metal per hour.

4. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that the process is characterized by an Hourly Catalytic Productivity of at least 0.1 kg vinyl product per gm catalyst metal per hour.

5. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that the process is characterized by an Hourly Catalytic Productivity of from about 0.1 to about 0.4 kg vinyl product per gm catalyst metal per hour.

6. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 10 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of from 1:1 to 9:1 maintained in the reaction mixture.

7. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of

acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 5 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of from 1:1 to 9:1 maintained in the reaction mixture.

8. The process according to claim 1, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of from about 1.5:1 up to about 4:1 maintained in the reaction mixture.

9. The process according to claim 7, wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture as well as a molar ratio of vinyl acetate:carboxylic acid of more than 2:1 is maintained in the reaction mixture.

10. The process according to claim 1, wherein the reaction time for the process is from about 2 hours to about 20 hours.

11. The process according to claim 1, wherein the separated vinyl acetate is recycled at a rate of less than 8 kg of vinyl acetate for every kg of vinyl ester produced.

12. The process according to claim 1, wherein the carboxylic acid is selected from the group consisting of 2-ethylhexanoic acid, benzoic acid, neodecanoic acid, propionic acid, butyric acid, valeric acid, heptanoic acid, acrylic acid, methacrylic acid, stearic acid, and palmitic acid.

13. A semi-continuous process for selective formation of vinyl ester by reactive distillation from its corresponding carboxylic acid, the process comprising: (a) providing carboxylic acid, vinyl acetate, and a palladium acetate—bidentate ligand catalyst complex to a reaction mixture; (b) reacting the carboxylic acid and vinyl acetate in the presence of the palladium acetate—bidentate ligand catalyst complex in the reaction mixture to form a vinyl ester product and acetic acid; (c) continuously removing acetic acid and vinyl acetate from the reaction mixture; (d) separating at least a portion of the removed vinyl acetate from the removed acetic acid and recycling the separated vinyl acetate to the reaction mixture; (e) withdrawing reaction mixture as a crude vinyl ester product mixture which includes residual carboxylic acid, residual vinyl acetate, residual acetic acid, and palladium acetate—bidentate ligand catalyst complex; and (f) separating residual carboxylic acid, residual vinyl acetate, residual acetic acid, and palladium acetate—bidentate ligand catalyst complex from the crude vinyl ester product mixture to form a purified vinyl ester product; wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and the separation and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that carboxylic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture; and wherein further a molar ratio of vinyl acetate:carboxylic acid of from about 2:1 up to about 9:1 is maintained in the reaction mixture.

14. A semi-continuous process for selective formation of vinyl ester from neodecanoic acid, the process comprising: (a) purifying raw neodecanoic acid such that the purified neodecanoic acid is characterized by at least one of: i) a bromine value of less than 20 mmoles of Br_2/g; (ii) a peroxide value of less than 200 ppm; or (iii) permanganate time of at least 30 minutes; (b) reacting the purified neodecanoic acid and vinyl acetate in the presence of a homogeneous transvinylation catalyst comprising palladium in a reaction mixture to form a vinyl ester product and acetic acid; (c) continuously removing acetic acid and vinyl acetate from the reaction mixture and recycling at least a portion of the vinyl acetate to the reaction mixture; (d) withdrawing the reaction mixture and separating vinyl neodecanoate product from the reaction mixture; wherein the reaction conditions, feed to the reaction mixture, removal of acetic acid from the reaction mixture, and recycling of vinyl acetate to the reaction mixture are controlled and the catalyst is selected such that neodecanoic acid is converted to vinyl ester product with a selectivity of at least 80 mole %, and there is less than 15 weight % acetic acid in the crude product mixture.