Claims:

1. A process for the acetoxylation of olefins in a gaseous reaction stream containing an olefin, acetic acid and an oxygen-containing gas, wherein the reaction gas is passed over at least two catalyst zones of differing reactivity arranged in series, where the catalyst zones are located in one or more reaction tubes arranged in parallel.

2. The process as claimed in claim 1, wherein molecular oxygen is used as oxygen-containing gas.

3. The process as claimed in claim 1 or 2, wherein ethene and acetic acid are reacted to form vinyl acetate monomer.

4. The process as claimed in any of claims 1 to 3, wherein the catalyst zone nearest the gas entry end has a lower activity and the adjoining catalyst zones have an increasing activity in order through to the gas exit end.

5. The process as claimed in any of claims 1 to 4, wherein the activity of the individual catalyst zones is controlled by means of one or more of the following measures:

a.) variation of the content of activity-controlling promoters in the catalyst (potassium acetate, lithium acetate, sodium acetate, cesium acetate, rubidium acetate or mixtures of these)

b.) use of different metal contents of gold, palladium, cadmium based on the catalyst support

c.) variation of the mixing ratio of the noble metals, for example Pd:Au

d.) use of different BET surface areas of the catalyst supports used

e.) use of various bulk densities of the catalyst supports

f.) use of various catalyst support geometries

g.) use of different metal dispersions

h.) dilution of a vinyl acetate monomer catalyst which is too active/"super-active" by means of inert material

i.) use of a differing acidity and/or hydrophilicity of the catalyst support

j.) variation of the thickness of the active noble metal layer on the catalyst support.

6. The process as claimed in any of claims 1 to 5, wherein the shape of the catalyst support in one or more catalyst zones is in the form of spheres, cylinders, rings, shaped bodies having one or more through-channels, crown rings, wagon wheels, monoliths, trilobes or tetralobes.

7. The process as claimed in claim 6, wherein rings having a wall thickness of less than 2 mm are used.

8. The process as claimed in any of claims 1 to 7, wherein the catalysts used are present on SiO_2 supports or mixed oxide supports, with the metal oxides used being able to be of natural origin or be pyrogenically produced.

The invention claimed is:

1. A process for the acetoxylation of olefins in a gaseous reaction stream containing an olefin, acetic acid and an oxygen-containing gas, comprising passing a reaction gas comprising at least one olefin, oxygen, and acetic acid over at least two fixed catalyst zones of supported olefin acetoxylation catalysts of differing reactivity arranged in series, wherein the catalyst zones are located in one or more reaction tubes arranged in parallel.

2. The process of claim 1, wherein molecular oxygen is used as oxygen-containing gas.

3. The process of claim 1, wherein ethene and acetic acid are reacted to form vinyl acetate monomer.

4. The process of claim 1, wherein the catalyst zone nearest a reaction gas entry has a lower activity and adjoining catalyst zones have an increasing activity in order through to a gas exit.

5. The process of claim 1, wherein the activity of the individual catalyst zones is controlled by means of one or more of the following measures:

a) varying a content of potassium acetate, lithium acetate, sodium acetate, cesium acetate, rubidium acetate or their mixtures as activity-controlling promoters in the catalyst;

b) varying a metal content of gold, palladium, and/or cadmium in the catalyst;

c) varying a mixing ratio of noble metals, contained in the catalyst;

d) varying a BET surface area of a catalyst support;

e) varying a bulk density of a catalyst support;

f) varying a catalyst support geometry;

g) employing different metals as a catalyst component;

h) diluting an olefin acetoxylation catalyst with an inert material;

i) varying an acidity and/or a hydrophilicity of a catalyst support;

j) varying a thickness of an active noble metal layer on a catalyst support.

6. The process of claim 1, wherein a shape of a catalyst support in one or more catalyst zones is in the form of spheres, cylinders, rings, shaped bodies having one or more through-channels, crown rings, wagon wheels, monoliths, trilobes or tetralobes.

7. The process of claim 6, wherein rings having a wall thickness of less than 2 mm are used as catalyst supports.

8. The process of claim 1, wherein the catalysts are present on SiO_2 supports or mixed oxide supports, the metal oxides being of natural origin or pyrogenically produced.

9. The process of claim 1, wherein two catalyst zones are employed, and a first catalyst in a first catalyst zone nearest an inlet for the reaction gas has a lower activity than a second catalyst in a second catalyst zone downstream from the first catalyst zone.