CLAIMS

1. A process for selecting an inert material for use in monomer production comprising the steps of:

(a) providing a gaseous mixture (P1) comprising propylene, acrolein, and acrylic acid;

(b) feeding P1 in the vapor phase at a pressure of from 1 to 1.5 atm to a fixed bed reactor tube containing the inert material having a bed temperature of from 200 to 450°C for a contact time of at least 3 seconds, to produce a second mixture (P2) comprising acrolein and acrylic acid;

(c) selectively condensing components of P2 having a boiling point at a pressure of 1 atm of at least 20°C;

(d) analyzing the condensed components for phthalic acid, acrolein, and acrylic acid;

(e) based on the analysis, determining the PTA_{inert} of the inert material, wherein PTA_{inert} is the ratio of the mass of phthalic acid in P2 to the total mass of acrolein and acrylic acid collected from P2;

(f) determining the PTA_{empty} of a fixed bed reactor tube not containing an inert material by repeating steps (a) through (d) except that the fixed bed reactor tube does not contain an inert material, wherein the PTA_{empty} is the ratio of the mass of phthalic acid in P2 to the total mass of acrolein and acrylic acid collected from P2; and

(g) selecting the inert material for use in monomer production if the PTA_{inert} is less than or equal to the PTA_{empty}.

2. The process of claim 1 wherein the bed temperature in step (b) is from 250 to 350°C.

3. The process of claim 1 wherein P1 is produced by vapor phase oxidation of propylene to acrolein and acrylic acid.

4. The process of claim 1 wherein P1 is produced in a two-step process, wherein acrolein is first produced by oxidation of propylene, and the second step is vapor phase oxidation of acrolein to acrylic acid.

5. The process of claim 1 wherein P1 is provided by oxidizing gaseous propylene in a fixed bed reactor tube in the presence of a mixed metal oxide catalyst.

6. The process of claim 5 wherein the mixed metal oxide catalyst contains Mo and Bi.

7. A process for determining the inertness of an inert material for use in monomer production comprising the steps of:

(a) oxidizing gaseous propylene in a fixed bed reactor tube in the presence of a mixed metal oxide catalyst to generate a gaseous mixture (P1) comprising propylene, acrolein, and acrylic acid, wherein the mixed metal oxide catalyst contains Mo and Bi;

(b) feeding P1 in the vapor phase at a pressure of from 1 to 1.5 atm to a second fixed bed reactor tube containing an inert material having a bed temperature of from 200 to 450°C for a contact time of at least 3 seconds, to produce a second product mixture (P2) comprising acrylic acid;

(c) collecting P2 in a first trap (T1), having a trap skin temperature controlled at 0 to 5°C, wherein the uncondensed vapor from T1 is condensed in second, preferably stainless steel trap (T2), having a trap skin temperature controlled at 0 to 5°C, and wherein the uncondensed

vapor from T2 is condensed in third stainless steel trap (T3), having a trap skin temperature controlled at from -60 to -80°C, and wherein each trap contains a solvent, preferably isopropanol, and a polymerization inhibitor, preferably hydroquinone or phenothiazine;

(d) analyzing the uncondensed vapor from T3 for propylene, O_2, N_2, CO, and CO_2;

(e) analyzing the condensed vapor from each trap for phthalic acid, acrolein and acrylic acid;

(f) based on the analysis, determining the PTA_{inert} of the inert material, wherein PTA_{inert} is the ratio of the mass of phthalic acid in P2 to the total mass of acrolein and acrylic acid collected from P2;

(g) determining the PTA_{empty} of a fixed bed reactor tube not containing an inert material by repeating steps (a) through (e) except that the second fixed bed reactor tube does not contain an inert material, wherein the PTA_{empty} is the ratio of the mass of phthalic acid in P2 to the total mass of acrolein and acrylic acid collected from P2; and

(h) selecting the inert material for use in monomer production if the PTA_{inert} is less than or equal to the PTA_{empty}.