Claims

1. Process for the transition T1 between an ethylene or a propylene polymerization process carried out in a polymerization reactor in the presence of a catalyst al, ethylene or propylene and optionally an olefin co-monomer Al to produce an ethylene polymer or a propylene polymer P1 into an ethylene or a propylene polymerization process carried out in the same polymerization reactor in the presence of a catalyst a2, ethylene or propylene and optionally an olefin co-monomer A2 to produce an ethylene polymer or a propylene polymer P2 characterised in that

- catalyst al and a2 are different and compatible, and
  - (i) where a chromium catalyst a1 is used as the catalyst for producing P1, the catalyst a2 for producing P2 will also be a chromium catalyst;
  - (ii) if a Ziegler-Natta catalyst is used as the catalyst for producing P1, the catalyst for producing P2 will also be a Ziegler-Natta catalyst; and
  - (iii) if a metallocene catalyst is used as the catalyst for producing P1, the catalyst for producing P2 will also be a metallocene catalyst;
- catalyst al and catalyst a2 are both active and present in the reactor during at least part of the transition T1 from P1 to P2; and
- the transition T1 is performed continuously.

2. Process according to claim 1 wherein the polymerisation production rate ("R"), defined as the amount of polymer produced by unit of time (e.g. tons/hour), must fulfill the following equation

$$0.55 \times R_{P1} < R_{T1} < 1.45 \times R_{P1}$$

wherein R_{P1} is the steady state production rate of the polymer P1 just before the start of the transition T1, and R_{T1} is the production rate of the polymer during the transition T1.

3. Process according to claim 2 wherein the polymerisation production rate must fulfill the following equation

$$0.80 \times R_{P1} < R_{T1} < 1.20 \times R_{P1}$$

~~4. Process according to any of the preceding claims wherein no deinventorying of the reaction system contents is operated during the transition T1.~~

4. Process according to any of the preceding claims wherein the main monomer (ethylene or propylene) partial pressure (pMM) must fulfil the following equation

$$0.55 \times pMM_{P1} < \rho MM_{T1} < 1.45 \times pMM_{P1}$$

wherein pMM_{P1} is the main monomer partial pressure just before the start of the transition T1, and ρMM_{T1} is the main monomer partial pressure during the transition T1.

5. Process according to claim 4 wherein the main monomer partial pressure of the present invention must fulfil the following equation

$$0.80 \times pMM_{P1} < \rho MM_{T1} < 1.20 \times pMM_{P1}$$

6. Process according to any of the preceding claims wherein the transition T1 is operated in the absence of injection in the reactor of a catalyst killer.

7. Process according to any of the preceding claims wherein the polymerisation

catalyst activity, defined as the amount of polymer produced by unit of time and by amount of catalyst (e.g. g/hour/g cata), must fulfil the following equations

a. $0.55 \times A_{P1} < A_{T1} < 1.45 \times A_{P1}$

b. $0.55 \times A_{P2} < A_{T1} < 1.45 \times A_{P2}$

wherein A_{P1} is the activity of the catalyst system al used for the production of the polymer P1 just before the start of the transition T1 (i.e. in steady state operations), A_{P2} is the activity of the catalyst system a2 used for the production of the polymer P2 just after the end of the transition T1 (i.e. in steady state operations) and A_{T1} is the catalyst activity of the catalyst system used during the transition.

8~~9~~. Process according to claim 7~~8~~ wherein the polymerisation catalyst activity must fulfil the following equations

a. $0.80 \times A_{P1} < A_{T1} < 1.20 \times A_{P1}$

b. $0.80 \times A_{P2} < A_{T1} < 1.20 \times A_{P2}$

~~10. Process according to any of the preceding claims wherein the transition T1 is operated between different compatible catalysts belonging to the same catalyst family.~~

9~~11~~. Process according to any of the preceding claims wherein the presence of a co-monomer is mandatory and co-monomer Al and co-monomer A2 are the same co-monomer.

10~~12~~. Process according to any of the preceding claims wherein the mass of polymer present in the reactor during the transition is at least 75% of the mass of polymer just

before the start of the transition (i.e during steady production of the polymer), preferably at least 80%, more preferably at least 90%, most preferably at least 95%.

11~~13~~. Process according to any of the preceding claims wherein the main monomer is ethylene or propylene and the optional comonomer is selected from alpha-olefins having 2 to 12 carbon atoms, e.g from ethylene, propylene, 1-butene, 1-hexene, 4-methyl-1-pentene and 1-octene.

~~14. Process according to any of the preceding claims wherein the continuous transition T1 includes an additional polymerisation control step which takes place at the beginning of the transition T1 and which takes into account the intrinsic behaviour of the respective polymerisation catalyst a1 and a2.~~

~~15. Process according to claim 14 wherein said polymerisation control step includes at least one action which can be chosen amongst a decrease/increase of the main monomer partial pressure, a decrease/increase of the main monomer feed rate, a decrease/increase of the ratio of comonomer to main monomer, a decrease/increase of the rate of introduction of the co-catalyst, a decrease/increase of the rate of introduction of a catalyst activity improver (e.g. an halogenated component like an alkyl chloride and/or chloroform), a decrease/increase of the partial pressure of hydrogen.~~

~~16. Process according to any of the preceding claims wherein the continuous transition T1 includes an additional polymerisation control step which takes place~~

~~towards the end of the transition T1 and which takes into account the intrinsic behaviour of the respective polymerisation catalyst a1 and a2.~~

~~17. Process according to claim 16 wherein said polymerisation control step includes at least one action which can be chosen amongst a decrease/increase of the main monomer partial pressure, a decrease/increase of the main monomer feed rate, a decrease/increase of the ratio of comonomer to main monomer, a decrease/increase of the rate of introduction of the co-catalyst, a decrease/increase of the rate of introduction of a catalyst activity improver (e.g. an halogenated component like an alkyl chloride and/or chloroform), a decrease/increase of the partial pressure of hydrogen.~~

12~~18~~. Process according to any of the preceding claims wherein the reactor is a gas phase fluidised bed reactor.