Claims

1. A process for the polymerisation of olefins in a polymerisation reactor system, the polymerisation reactor system comprising:

(i) a gas phase reactor having a gas outlet and one or more withdrawal lines for withdrawal of a polymer-containing stream,

(ii) a recycle loop for recycling gas exiting the reactor through the gas outlet back to the reactor,

(iii) a polymer separation system for separating reactants from the polymer product in the withdrawn polymer-containing stream, and

(iv) a recycle system for recycling reactants removed from the reactor in the withdrawn polymer-containing stream back to the reactor,

characterised in that a scavenger is introduced directly into one or more of the recycle loop, the polymer separation system and the recycle system.

~~2. A process according to claim 1 wherein the scavenger introduced directly into one or more of the recycle loop, the polymer separation system and the recycle system is not introduced in any line which line itself feeds directly to the reactor.~~

~~3. A process according to claim 1 or claim 2 wherein scavenger is introduced either into equipment which is in the recycle loop, in the polymer separation system or in the recycle system, or in a line upstream of such equipment.~~

~~4. A process according to any one of the preceding claims wherein scavenger is introduced~~ and into or upstream of a vessel or other equipment which is in the recycle loop, in the polymer separation system or in the recycle system and in which liquid may accumulate during polymerisation.

~~5~~2. A process according to ~~any one of the preceding~~ claims 1 wherein the recycle loop comprises at least one step where, during polymerisation, the gas which has exited the reactor is cooled sufficiently to form condensed liquid.

~~6~~3. A process as claimed in claim ~~5~~ 2 wherein the recycle loop in the reaction system comprises at least one step where, during polymerisation, the gas which has exited the reactor is cooled sufficiently to form a mixture of gas and condensed liquid and a subsequent separator wherein at least part of the condensed liquid is separated from the mixture.

~~7~~4. A process as claimed in claim ~~6~~ 3 wherein scavenger is introduced into a line upstream of the separator.

~~8~~5. A process as claimed in claim ~~7~~ 4 wherein scavenger is introduced in the line between the condenser and the separator.

~~9~~6. A process as claimed in claim ~~6~~ 3 wherein a fresh feed, such as fresh comonomer, is passed to the process via a feed line to the separator and scavenger is introduced to the separator in the same line.

~~10~~7. A process as claimed in claim ~~6~~ 3 wherein scavenger is introduced directly to the separator, and preferably directly into the liquid phase in the separator.

~~11~~8. A process as claimed in any one of the preceding claims wherein scavenger is introduced directly in one or more olefin recovery steps in the recycle system where the olefin is condensed, and/or in lines or equipment in the recycle system by which the condensed olefin is recycled to the reactor.

~~12~~9. A process as claimed in any one of the preceding claims wherein scavenger is introduced directly in one of more steps by which olefins are recovered by condensation from a process vent.

~~13~~10. A process as claimed in any one of the preceding claims wherein scavenger is introduced in a recycle stream to a catalyst injection nozzle.

~~14~~11. A process as claimed in any one of the preceding claims wherein scavenger is introduced to said one or more of the recycle loop, the polymer separation system and the recycle system prior to commencement of catalyst injection.