CLAIMS

1. A process for the preparation of a polyethylene comprising:
(i) 20-70% wt of a lower molecular weight ethylene homopolymer, wherein said lower molecular weight ethylene homopolymer has a weight average molecular weight of 5,000 to 150,000 g/mol;
(ii) 20-70% wt of a first higher molecular weight ethylene copolymer, wherein said first higher molecular weight ethylene copolymer has a weight average molecular weight of 200,000 to 700,000 g/mol; and
(iii) 0.5-9.5% wt of a second higher molecular weight ethylene copolymer, wherein said second higher molecular weight ethylene copolymer has a weight average molecular weight of 200,000 to 2,000,000 g/mol,
wherein said second higher molecular weight ethylene copolymer has a greater weight average molecular weight than said first higher molecular weight ethylene copolymer
and wherein said process comprises the sequential steps (a)-(c):
(a) polymerising ethylene and optionally an $\alpha$-olefin comonomer in a first reactor to produce a lower molecular weight ethylene homopolymer;
(b) polymerising ethylene and an $\alpha$-olefin comonomer in a second reactor to produce a second higher molecular weight ethylene copolymer; and
(c) polymerising ethylene and an $\alpha$-olefin comonomer in a third reactor to produce a first higher molecular weight ethylene copolymer.

2. A process as claimed in claim 1 wherein, during said polymerisation to produce a second higher molecular weight ethylene copolymer, at least some of said lower molecular weight ethylene homopolymer is present in said second reactor.

3. A process as claimed in claim 1 wherein, during said polymerisation to produce a second higher molecular weight ethylene copolymer, only a portion of said lower molecular weight ethylene homopolymer is present in said second reactor.

4. A process as claimed in claim 3, wherein the other portion of said lower molecular weight ethylene homopolymer is transferred directly to the polymerisation of the first higher molecular weight ethylene copolymer in the third reactor.

5. A process as claimed in any one of claims 1 to 4 wherein, during said polymerisation to produce a first higher molecular weight ethylene copolymer, said lower molecular weight ethylene homopolymer and said second higher molecular weight ethylene copolymer, are present in said third reactor.

6. A process as claimed in any one of claims 1 to 4, wherein each of said polymerisations is a particle form polymerisation.

7. A process as claimed in claim 6, wherein each of said polymerisation is a slurry polymerisation.

8. A process as claimed in any one of claims 1 to 4, wherein said polyethylene is multimodal.

9. A process as claimed in any one of claims 1 to 4, wherein said polyethylene has a multimodal molecular weight distribution.

10. A process as claimed in any one of claims 1 to 4, wherein the amount of said second higher molecular weight ethylene copolymer is 1.5 to 9.5 % wt.

11. A process as claimed in claim 10, wherein the amount of said second higher molecular weight ethylene copolymer is 1.2 to 8.5 % wt.

12. A process as claimed in any one of claims 1 to 4, wherein said second higher molecular weight ethylene copolymer has a higher % wt comonomer content than said first higher molecular weight ethylene copolymer.

13. A process as claimed in any one of claims 1 to 4, wherein said second higher molecular weight ethylene copolymer has a comonomer content of 1 to 20 % wt.

14. A process as claimed in any one of claims 1 to 4, wherein said $\alpha$-olefin in the second reactor is selected from propylene, 1-butene, 1-pentene, 4-methyl-1-pentene, 1-hexene, 1-octene and mixtures thereof.

15. A process as claimed in any one of claims 1 to 4, wherein said second higher molecular weight ethylene copolymer is an ethylene 1-butene copolymer.

16. A process as claimed in any one of claims 1 to 4, wherein said first higher molecular weight ethylene copolymer has a comonomer content of 0.3 to 2.5 %wt.

17. A process as claimed in any one of claims 1 to 4, wherein said $\alpha$-olefin in the third reactor is selected from propylene, 1-butene, 1-pentene, 4-methyl-1-pentene, 1-hexene, 1-octene and mixtures thereof.

18. A process as claimed in any one of claims 1 to 4, wherein said first higher molecular weight ethylene copolymer is an ethylene 1-butene copolymer.

19. A process as claimed in any one of claims 1 to 4, wherein said first higher molecular weight ethylene copolymer is present in an amount of 40-60 % wt.

20. A process as claimed in any one of claims 1 to 4, wherein said lower molecular weight ethylene homopolymer has a $MFR_2$ of 50-4000 g/10min.

21. A process as claimed in any one of claims 1 to 4, wherein each polymerisation is with a Ziegler Natta catalyst.

22. A process as claimed in any one of claims 1 to 4, wherein said polyethylene has a density of 945-962 kg/$m^3$ and/or a $MFR_5$ of 0.15-0.6 g/10min.