CLAIMS

1. A continuous process for the tetramerisation of ethylene, the process including:

a) providing an activated catalyst comprising:

i) a source of chromium;

ii) a ligating compound of the formula

$$R^1R^2P^1XP^2R^3R^4$$

wherein P^1 and P^2 are phosphorus atoms;
X is a linking group between P^1 and P^2, such that any heteroatom on the shortest connecting path between P^1 and P^2 is either bound to P^1 or P^2 or adjacent to an atom bound to P^1 or P^2; and
R^1 to R^4 are independently a hydrocarbyl group, an organoheteryl group or a heterohydrocarbyl group; and

iii) optionally a catalyst activator or combination of catalyst activators; and

b) contacting ethylene to be tetramerised with the activated catalyst at a reaction temperature of from above 80°C to 115°C, thereby to form at least 30% 1-octene and a polyethylene co-product that, together with any other reaction products, remain substantially dissolved in the liquid phase, the polyethylene co-product being characterised as having:

i) a weight average molecular weight (Mw), as determined by gel permeation chromatography, of less than 200 000 g/mol;

ii) a number average molecular weight (Mn), as determined by gel permeation chromatography, of less than 3 000 g/mol; and

iii) a melt flow index, as determined by ASTM method D1238 at 190°C and 21.6kg, of more than 20 g/10 minutes.

2. A continuous process according to claim 1, wherein the ethylene is contacted with the activated catalyst at a reaction temperature of from above 85°C to 110°C.

3. A continuous process according to claim 1, wherein the ethylene is contacted with the activated catalyst at a reaction temperature of from above 90°C to 105°C.

4. A continuous process according to claim 1, wherein the polyethylene has:
   i) a weight average molecular weight (Mw), as determined by gel permeation chromatography, of less than 150 000 g/mol;
   ii) a number average molecular weight (Mn), as determined by gel permeation chromatography, of less than 2 500 g/mol; and
   iii) a melt flow index, as determined by ASTM method D1238 at 190°C and 21.6kg, of more than 35 g/10 minutes.

5. A continuous process according to claim 1, wherein the polyethylene has:
   i) a weight average molecular weight (Mw), as determined by gel permeation chromatography, of less than 100 000 g/mol;
   ii) a number average molecular weight (Mn), as determined by gel permeation chromatography, of less than 2 000 g/mol; and
   iii) a melt flow index, as determined by ASTM method D1238 at 190°C and 21.6kg, of more than 50 g/10 minutes.

6. A continuous process according to claim 1, wherein the polyethylene has:
   i) a weight average molecular weight (Mw), as determined by gel permeation chromatography, of less than 50 000 g/mol;
   ii) a number average molecular weight (Mn), as determined by gel permeation chromatography, of less than 1 900 g/mol; and
   iii) a melt flow index, as determined by ASTM method D1238 at 190°C and 21.6kg, of more than 60 g/10 minutes.

7. A continuous process according to claim 1, wherein at least one of R^1 to R^4 is an aromatic moiety or a heteroaromatic moiety.

8. A continuous process according to claim 1, wherein R^1 to R^4 are all aromatic or heteroaromatic moieties.

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