Claims

1. A polymer compound comprising:

50 to 99 percent by weight of a polymer; and

1 to 50 percent by weight of a cracking catalyst;

wherein the cracking catalyst is an acidic porous solid material having a proton content in the range of 1 micromole to 1 mole per gram

and wherein said cracking catalyst is directly compounded into said polymer compound.

2. The polymer compound according to claim 1, wherein the polymer is selected from polyethylene, polypropylene, polystyrene, polyethylene terephthalate, polyvinyl chloride, poly methyl methacrylate, and any combination thereof.

3. The polymer compound according to claim 1 or 2, wherein the polymer is polyethylene selected from low density polyethylene, linear low density polyethylene, medium density polyethylene, and high density polyethylene.

4. The polymer compound according to claim 1, wherein the acidic porous solid material is selected from acidic clay, aluminium oxide, silicon dioxide, zirconium oxide, zinc oxide, titanium dioxide, magnesium oxide, layered double oxide, and any combination thereof.

5. The polymer compound according to claim 4, wherein the acidic porous solid material is acidic clay prepared by treating a non-acidic clay with an acid chemical.

6. The polymer compound according to claim 5, wherein the non-acid clay is a bentonite clay.

7. The polymer compound according to any of the preceding claims, wherein the cracking catalyst has an average diameter in the range of 1 to 500 micrometers.

8. The polymer compound according to any one of the preceding claims wherein the cracking catalyst is provided at 7% by weight of a bentonite having a proton content of about 1.7 micromoles per gram.

9. Use of the polymer compound according to any of the preceding claims to produce a plastic product, including bag, bottle, film and pipes, via heat forming methods, including heat extrusion.

10. Use of the polymer compound according to claim 9, wherein the heat required for forming and/or extruding the plastic products is in the range of 100–230°C.

11. A plastic recycling process comprising:

placing a plastic product produced from the polymer compound according to any one or in combination of claim 1 to 8 in a reactor;

heating the plastic product to a temperature in the range of 200 to 1,000°C; and

recovering recycled products from the reactor, including C1 – C5 light hydrocarbon gases, liquid oil, and solid tar.

12. The plastic recycling process according to claim 10, wherein the plastic product is bag, film, or combination thereof.

13. The plastic recycling process according to claim 10 or 11, wherein the process further comprises, prior to step (b), purging the reactor with an inert gas.

14. The plastic recycling process according to any one or combination of Claims 11–13 wherein the process is adapted to recover C1-C5 light hydrocarbon gases by maintaining reactor temperature at 450°C or lower and for a period ranging from 70–80 minutes.

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