CLAIMS

1. A method for breaking down long chained hydrocarbons from plastic-containing waste and organic liquids based on crude oil, comprising

- providing material containing long-chained hydrocarbons;
- heating a specific volume of the material containing long-chained hydrocarbons to a cracking temperature, at which cracking temperature the chains of hydrocarbons in the material start cracking into shorter chains; and
- for the specific volume having a temperature above the cracking temperature, exposing the specific volume to heat which is less than or equal to 50 °C above the temperature of the specific volume.

2. The method of claim 1, while exposing, adjusting a pressure of the specific volume to limit a gas content.

3. The method of claim 2, while exposing, adjusting the pressure of the specific volume at between 10 and 35 bar, preferably at 20 bar.

4. The method according to any one of the preceding claims, wherein an additive is provided while heating the specific volume until it is sufficiently flowable, the additive being an antioxidant particularly provided to donate a hydride to a chain end after cracking a long-chained polymer, the additive preferably containing butylated hydroxytoluene (BHT) and/or zeolite.

5. The method according to any one of the preceding claims, further comprising lowering a pressure of the specific volume after having exposed the specific volume to heat.

6. The method according to any one of the preceding claims, further comprising after having exposed the specific volume to heat, adjusting a temperature of the specific volume to adjust gas evaporating from the specific volume.

7. The method of claim 6, wherein the temperature is adjusted by cooling the specific volume.

8. The method according to any one of claims 6 or 7, wherein evaporated gas passes a partial condenser, the partial condenser being configured to separate long-chained hydrocarbons from the gas.

9. The method according to any one of claims 6 to 8, wherein the specific volume after having evaporated gas is reheated to crack remaining long-chained hydrocarbons, preferably by less than 25 °C above the temperature of the specific volume prior to reheating, and wherein the reheated specific volume is mixed with further material having been exposed to heat for the first time, the mixing ratio of reheated material to the material after having been exposed to heat for the first time preferably is between 5 : 1 and 15 : 1, more preferably between 8 : 1 and 10 : 1.

10. The method according to any one of the preceding claims, further comprising separating coke from the specific volume after having exposed the specific volume to heat.

11. The method according to any one of the preceding claims, wherein the specific volume after having been exposed to heat enters a separator vessel, where gas evaporates preferably via a partial condenser, and coke is separated via an outlet structure, the outlet structure preferably maintaining a minimum level of liquid material inside the separator vessel while having an opening of the separator tank to the outlet structure below the minimum level of liquid material.

12. The method of claim 11 wherein the outlet structure comprises a lock either opening towards the separator vessel to separate coke or blocking the outlet structure from the separator vessel to release the coke in the lock.

13. The method of claim 11 wherein the outlet structure comprises a valve and a cooling structure maintaining the minimum level of liquid material inside the separator vessel and releasing the coke once the coke temperature has dropped below its combustion temperature.

14. The method according to any one of claims 11 to 13, wherein the separator vessel provides a setting zone adjacent to the opening of the separator tank to the outlet structure.

15. An apparatus for breaking down long chained hydrocarbons from plastic-containing waste and organic liquids based on crude oil, the apparatus comprising:

- a first tube providing a flow path for material containing long chained hydrocarbons; and
- a second tube providing a flow path for a heating medium;

wherein the second tube contacts the first tube such that heat can transfer from the inside of the second tube into the first tube, and wherein the heating medium is controlled to have a temperature not more than 50 °C above a predetermined final temperature for the material containing long chained hydrocarbons when entering the second tube and to have a temperature not more than 50 °C above a temperature of the material containing long chained hydrocarbons.