CLAIMS

1. A system (100) of converting solid waste of plastics/rubber into hydrocarbon fuel, said system (100) comprising:

(i) a thermal cracking reactor (110) for cracking the solid waste and a catalyst having a particle size in the range of 0.1mm – 10mm and the ratio of catalyst to solid waste to being 0.01:1 to 0.05:1 as feed at a temperature in the range of 200 to 475 °C to obtain a catalytic thermal cracking product containing a gaseous hydrocarbon stream and a coke residue; and

(ii) a condenser (120) for receiving said gaseous hydrocarbon stream and cooling said gaseous hydrocarbon stream to obtain ~~an~~ an at least partly condensate stream containing a liquid
~~liquid~~ hydrocarbon oil of smaller molecules and non-condensable gaseous hydrocarbons,

(iii) an oil storage tank (142) which is in operative communication with the condenser (120) to receive condensate stream from the condenser (120);

wherein said thermal cracking reactor (110) having an operative top side-wall (103) and an operative bottom side-wall (105) is positioned in horizontal and comprising a feed inlet (104) at one end and a gas outlet (116) at an opposite end on said operative top side-wall (103), a residue outlet (118) at said operative bottom side-wall (103), and an agitator device (106) used to push downwards the feed entering the reactor (110) at the fed inlet (104) ~~centrally positioned between said side-walls (103, 105)~~ along the operative longitudinal axis ~~of~~ the said reactor (110), ~~and wherein the condenser (120) is in operative communication with said gas outlet (116) of said reactor (110~~ so as to enable completion of gasification of the hydrocarbons in the solid waste~~)~~.

2. The system of Claim 1, further comprising the~~an~~ oil storage tank (142) comprises a scrubbing unit ~~which is~~ in ~~operative~~ communication with the oil storage tank (142) for receiving and non- condensable gaseous hydrocarbons for purifying ~~condenser (120) to receive condensate stream from the condenser (120).~~

~~3. The system of Claim 2, wherein the oil storage tank (142) comprises a scrubbing unit in operative communication with the oil storage tank (142) for receiving and non-condensable gaseous hydrocarbons for purifying.~~

34. The system of Claim 23, wherein the oil storage tank (142) comprises a burner chamber (134) for receiving purified non-condensable gaseous hydrocarbons for burning.

45. The system of Claim 23, wherein the scrubbing unit is a sodium hydroxide scrubbing

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unit (143).

56. The system of Claim 23, wherein the scrubbing unit is a calcium hydroxide scrubbing unit (144).

67. The system of Claim 23, wherein the scrubbing unit is a water scrubbing unit (145).

~~8. The system of Claim 1, wherein the agitator device (106) is used to push downwards the feed entering the reactor (110) at the fed inlet (104) along the operative longitudinal axis of the reactor (110) so as to enable completion of gasification of the hydrocarbons in the solid waste.~~

7. ~~9.~~ The system of Claim 2, wherein the burner chamber (134) is in operative communication with the scrubbing unit (145) for receiving purified non-condensable gaseous hydrocarbons for burning.

810. A method for converting solid waste of plastics/rubber into hydrocarbon fuel, said system (100) comprising the steps of:

(i) feeding the solid waste bring shredded into a particle size of less than 20mm together with a catalyst into a thermal cracking ~~reactor~~ (110) which is horizontally positioned, wherein the cracking reactor (110) is provided with an operative top side-wall (103) and an operative bottom side-wall (105), a residue outlet (118) at said operative bottom side-wall (103), having a feed inlet (104) at one end thereof and a gas outlet (116) at the opposite end of the operative top side-wall (103), and an agitator device (106) centrally positioned between the side-walls (103, 105) along the operative longitudinal axis of the reactor (110);

(ii) subjecting the solid waste in the reactor to thermal cracking at a temperature in the range of 200 to 475 °C to obtain a catalytic thermal cracking product containing a gaseous hydrocarbon stream and coke residue;

(iii) receiving the gaseous hydrocarbon stream in a condenser (120) and discharging the coke residue from step (ii) at the residue outlet (118);

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(iv) cooling the gaseous hydrocarbon stream in the condenser (120) to obtain an at least partly condensate streaming containing a liquid hydrocarbon oil of smaller molecules and non-condensable gaseous hydrocarbons;

(v) collecting the condensate stream in an oil storage tank and conveying the

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non-condensable gaseous hydrocarbons to scrubbing unit to purify the non-condensable gaseous hydrocarbons; and

(vi) passing the purified non-condensable gaseous hydrocarbons to a burner chamber (134) for burning.

~~11. The method of Claim 10, wherein the solid waste is shredded into a particle size of less than 20mm.~~

912. The method of Claim 810, wherein the catalyst is selected from the group consisting of aluminum silicate, barium silicate, beryllium silicate, calcium silicate, iron silicate, magnesium silicate, manganese silicate, potassium silicate, sodium silicate, zirconium silicate, copper silicate, tin silicate, iron silicate, lead silicate, tungsten silicate, cesium silicate lithium silicate, aluminum, bismuth, copper (cuprum), iron (ferrum), lead, magnesium, manganese, nickel, tin (stannum), tungsten, zinc, aluminum oxide, bismuth oxide, copper (cuprum) oxide, iron (ferrum) oxide, lead oxide, magnesium oxide, manganese oxide, nickel oxide, tin (stannum) oxide, tungsten oxide, zinc oxide, aluminum carbonate, ~~calcium carbonate, sodium carbonate, bismuth carbonate, copper (cuprum) carbonate, iron (ferrum) carbonate, lead carbonate, magnesium carbonate, manganese carbonate, nickel carbonate, tin (stannum) carbonate, tungsten carbonate, zinc carbonate,~~ silicon carbide, calcium carbide, natural and synthetic zeolite, alumina, fuller's earth, bauxites, metal borates, metal borides, ZSM-5, FCC Y-catalyst, NiMo over γ-alumina, NiW loaded on amorphous silica-alumina, cobalt loaded active carbon (Co-AC), DHC-8 (commercial silica-alumina catalyst), HZSM-5, activated red mud, calcined kaolin, Eckalite-1, Silton CPT-30, Silton MT 100, Mizukasieves Y-420, Re Y-zeolite, acidic alumina, Na Y-zeolite, and H Y-zeolite.

103. The method of Claim 912, wherein the catalyst has a particle size in the range of 0.1mm to 10mm and the ratio of the catalyst to the solid waste is in the range of 0.0.1:1 to 0.05:1 and is a mixture containing at least one~~e~~ ~~-~~metal silicate, at least one metal oxide, at least one zeolite type compound, and at least one additive.

~~14. The method of Claim 12, wherein the catalyst has a particle size in the range of 0.1 mm to 10mm.~~

~~15. The method of Claim 11, wherein the ratio of the catalyst to the solid waste is in the range of 0.01:1 to 0.05:1.~~

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