CLAIMS

1. A liquid fuel of hydrocarbons from one or more crudes, either alone or combined with one or more feeds of light tight oils or high sulfur fuel oils or other heavier residual oils, said fuel comprising

(a) liquid fractions of over sulfur breakpoint that have been treated by hydrogen in presence of catalyst to reduce or remove sulfur

wherein breakpoint is point at which the change (rise over run) in sulfur content per change in unit volume of upper first distillation cut produced during processing of said crude oil is no longer substantially horizontal or flat, but instead at said breakpoint, as the amount of said cut is slightly increased, said sulfur content starts to rapidly increase, or increases exponentially, to cause a high change in rate of rise over per unit run, wherein for said run, change is change in unit volume of fraction and for said rise, change is change in unit of sulfur content,

and

(b) liquid fractions at or below said sulfur breakpoint that have not been treated by hydrogen in presence of catalyst to reduce or remove sulfur,

wherein said fuel is further characterized in that said fuel:

(1) does not contain residue insoluble in one or more solvents used for solvent separation selected from group consisting of paraffinic solvents such propane, butane, pentane and others up to and including heptane, and

(2) has density at 15 ºC in range of 820 to 880 Kg/M3.

2. A fuel in accordance with Claim 1 characterized in that said fuel comprises hydrocarbons from one or more crude oil feeds, either alone or combined with one or more feeds of light tight oils or high sulfur fuel oils or other heavier residual oils,

said fuel characterized by comprising

(a) liquid fractions of over sulfur breakpoint of said feed, which fractions over sulfur breakpoint have been treated with hydrogen in presence of catalyst to reduce or remove sulfur

wherein said sulfur breakpoint is ratio rise-over-run of

(x) change of sulfur content of feed as rise, to

(y) change of percentage mass or volume of feed as run,

wherein ratio of rise-to-run is in range of (i) 0.2-to-1 to (ii) 1-to-1,

and

(b) liquid fractions at or below said sulfur breakpoint cut, which fractions at or below sulfur breakpoint have not been treated with hydrogen in presence of catalyst to reduce or remove sulfur
(c) wherein said fuel is further characterized in that

(1) said fuel does not contain residue insoluble in one or more solvents used for solvent separation selected from group consisting of paraffinic solvents such propane, butane, pentane and others up to and including heptane,

(2) hydrocarbon of said fuel having highest boiling point is the highest boiling component soluble in said one or more solvents used for solvent separation

(3) said fuel comprises a range of hydrocarbons without stabilization from (i) C3 to greater than C20 hydrocarbons or (ii) C5 to greater than C20 hydrocarbons,

said hydrocarbons having

(i) an initial boiling point being the lowest boiling point component of liquid fraction of said crude oil feed at or below said sulfur breakpoint which component is not treated by hydrogen and is combined in said fuel,

(ii) highest boiling point being the highest boiling point component of a liquid fraction over said sulfur breakpoint, said fraction is hydrotreated after removal of metals enriched residue insoluble in said solvents used in said solvent separation and combined in said fuel,

wherein said fuel has an actual sulfur content of 0.50% m/m (wt.%) or less.

3. A fuel in accordance with Claim 1 comprising a combination of hydrocarbons ranging from lowest boiling portion of said untreated liquid fraction to highest boiling portion of hydrotreated solubles from solvent separation, wherein wherein said fuel has pour point maximum of 0°C, and viscosity maximum of 10 cSt at 50°C.

4. A fuel in accordance with Claim 1 comprising a first hydrotreated stream which is a reduced sulfur stream having a sulfur content less than 10 ppmwt of sulfur, and a second hydrotreated fuel fractions which is a reduced sulfur stream having a sulfur content in the range of 0.12 to 0.18 wt.% sulfur, and said untreated fraction has a sulfur content in excess of, at or below, the target sulfur content.

5. A fuel in accordance with Claim 1 having a target sulfur content of an IMO specification for marine fuel.

6. A fuel in accordance with Claim 1 comprising unstabilized light tight oil or unstabilized condensate, or a combination of unstabilized light tight oil and unstabilized condensate, with one or more untreated fractions below sulfur breakpoint and hydrotreated streams over sulfur breakpoint.