CLAIMS

1. A process for treating a straight-run naphtha boiling range stream containing mercaptan compounds, the process comprising:

(a) oxidizing mercaptan compounds in the straight-run naphtha boiling range stream to provide a mercaptan-depleted naphtha stream rich in disulfide compounds, wherein the mercaptan compounds are depleted in the substantial absence of any caustic solvent;

(b) passing the mercaptan-depleted naphtha stream rich in disulfide compounds to a naphtha splitter column;

(c) fractionating at least a portion of the mercaptan-depleted naphtha stream rich in disulfide compounds into only two streams, a light naphtha stream lean in disulfide compounds and a heavy naphtha stream rich in disulfide compounds; and

(d) passing the heavy naphtha stream rich in disulfide compounds to a hydroprocessing unit to covert the disulfide compounds to hydrocarbons and hydrogen sulfide.

2. The process of claim 1, wherein oxidizing mercaptan compounds comprises contacting the mercaptan compounds in the naphtha boiling range stream with an oxidizing catalyst and oxygen.

3. The process of claim 2, wherein the oxidizing catalyst comprises a metal component retained on an inorganic oxide support, wherein the metal component is selected from one or more of vanadium, chromium, manganese, cobalt, nickel, copper, and zinc.

4. The process of claim 3, wherein the metal component comprises copper.

5. The process of claim 4, wherein the copper is present as copper metal, copper oxide, copper sulfide, or a combination thereof.

6. The process of claim 3, wherein the metal component is present in an amount of from 10 to 40 wt. %, based on a total weight of the catalyst.

7. The process of claim 3, wherein the inorganic oxide support is selected from alumina, silica, zirconia, titania, thoria, boria, magnesia, chromia, stannic oxide, and combinations thereof.

8. The process of claim 1, wherein conditions for oxidizing mercaptan compounds include a pressure of from 101 to 2068 kPa; a temperature of from 35°C to 200°C; and a liquid hourly space velocity of from 1 to 10 h^{-1}.

9. The process of claim 1, wherein the straight-run naphtha is derived from crude oil or natural gas condensate resources.

10. An apparatus for treating a naphtha boiling range stream containing mercaptan compounds, the apparatus comprising:

(a) an oxidation unit to provide a mercaptan-depleted naphtha stream rich in disulfide compounds; and

(b) a naphtha splitter column in downstream communication with the oxidation unit to provide a light naphtha stream lean in disulfide compounds in a naphtha splitter overhead line and a heavy naphtha stream rich in disulfide compounds in a naphtha splitter bottoms line.

11. The apparatus of claim 10, further comprising a hydroprocessing unit in downstream communication with the naphtha splitter bottoms line to provide a heavy naphtha stream lean in disulfide compounds.

12. The apparatus of claim 10, further comprising a distillation unit in upstream communication with the oxidation unit to provide a naphtha boiling range stream.

13. The apparatus of claim 12, wherein the distillation unit is a crude oil atmospheric distillation unit or a natural gas condensate splitter column.