CLAIMS

What is claimed is:

1. A method comprising: (a) contacting a liquid hydrocarbon with an aqueous solution comprising an oxidizing agent to form a reaction mixture comprising an aqueous component and a hydrocarbon component, wherein the liquid hydrocarbon comprises at least an alkene$_{(C4-30)}$, and a phosphine selected from the group consisting of trimethylphosphine, tributylphosphine and triphenylphosphine at a ratio of phosphine to oxidizing agent of 0.25:1-5:1; (b) reacting the oxidizing agent with a phosphine selected from the group consisting of trimethylphosphine, tributylphosphine and triphenylphosphine for 10-120 minutes to form a phosphine oxide selected from the group consisting of trimethylphosphine oxide, tributylphosphine oxide and triphenylphosphine oxide; and (c) removing the aqueous component comprising phosphine oxide $_{(C\leq30)}$ from the hydrocarbon component; wherein the method reduces the amount of phosphorus in the liquid hydrocarbon to less than 25 ppm.

2. The method of claim 1, wherein the oxidizing agent is selected from the group consisting of sodium hypochlorite (NaClO), potassium hypochlorite, calcium hypochlorite, hydrogen peroxide, chlorine gas, bromine gas, ozone, air, sodium percarbonate, sodium perborate, chlorine dioxide, oxygen, t-butyl hydroperoxide, alkyl$_{(C\leq12)}$ peroxide, aryl$_{(C\leq12)}$ peroxide and aralkyl$_{(C\leq12)}$.

3. The method of claim 1, wherein the aqueous solution is neutral.

4. The method of claim 1, wherein the aqueous solution has a pH greater than 9.

5. The method of claim 1, wherein the aqueous solution comprises sodium hydroxide (NaOH), potassium hydroxide, lithium hydroxide, calcium hydroxide, barium hydroxide, strontium hydroxide, or magnesium hydroxide.

6. The method of claim 1, wherein step (b) further comprises agitating the aqueous component with the hydrocarbon component.

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7. The method of claim 1, wherein step (b) further comprises reacting the oxidizing agent with the phosphine at a temperature from about 1 °C. to about 150 °C.

8. The method of claim 1, further comprising a washing step, wherein the separated hydrocarbon component of step (c) is washed with a second aqueous solution.

9. The method of claim 8, wherein the wash with a second aqueous solution occurs in an extraction column.

10. The method of claim 1, wherein the liquid hydrocarbon was obtained from a dimerization reaction of ethylene.

11. The method of claim 1, wherein the liquid hydrocarbon is gasoline or a gasoline precursor.

12. The method of claim 10, wherein the phosphine was obtained from a catalyst used to catalyze the dimerization reaction.

13. The method of claim 12, wherein the liquid hydrocarbon further comprises an $alkane_{(C\leq 30)}$.

14. The method of claim 1, wherein the liquid hydrocarbon further comprises $alkenes_{(C5\text{-}10)}$.

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