C L A I M S

1. A process for the recovery of aliphatic hydrocarbons from a liquid hydrocarbon feedstock stream comprising aliphatic hydrocarbons, heteroatom containing organic compounds and optionally aromatic hydrocarbons, wherein the liquid hydrocarbon feedstock stream (1) comprises at least part of a hydrocarbon product formed in a process comprising cracking of waste plastics, wherein at least part of the plastics comprises heteroatom containing organic compounds, said process comprising the steps of:

a) mixing at least part of the liquid hydrocarbon feedstock stream with a stream having a pH above 7 and comprising a washing solvent a) which contains one or more heteroatoms and separating the resulting mixture into a first stream comprising washing solvent a) and heteroatom containing compounds and a second stream comprising aliphatic hydrocarbons, heteroatom containing organic compounds and optionally aromatic hydrocarbons,

said step a) further comprising:

a1) before mixing with the stream having a pH above 7: mixing at least part of the liquid hydrocarbon feedstock stream with a stream having a pH below 7 and comprising a washing solvent a) which contains one or more heteroatoms and separating the resulting mixture into a first stream comprising washing solvent a) and heteroatom containing compounds and a second stream comprising aliphatic hydrocarbons, heteroatom containing organic compounds and optionally aromatic hydrocarbons, and mixing at least part of said second stream with the stream having a pH above 7, and/or

a2) after mixing with the stream having a pH above 7: mixing at least part of the second stream, resulting from the

mixing with the stream having a pH above 7 and the separation into first and second streams, with a stream having a pH below 7 and comprising a washing solvent a) which contains one or more heteroatoms and separating the resulting mixture into a first stream comprising washing solvent a) and heteroatom containing compounds and a second stream comprising aliphatic hydrocarbons, heteroatom containing organic compounds and optionally aromatic hydrocarbons, and feeding at least part of said second stream to step b); and

b) contacting at least part of the second stream resulting from step a) with an extraction solvent b) which contains one or more heteroatoms and subjecting that stream to liquid-liquid extraction with extraction solvent b), resulting in a first stream comprising aliphatic hydrocarbons and optionally heteroatom containing organic compounds and a second stream comprising extraction solvent b), heteroatom containing organic compounds and optionally aromatic hydrocarbons.

2. The process according to claim 1, wherein the washing solvent a) comprises one or more solvents selected from the group consisting of water, ammonia and organic solvents selected from the group consisting of diols and triols, including monoethylene glycol (MEG), monopropylene glycol (MPG) and glycerol; glycol ethers, including oligoethylene glycols, including diethylene glycol, triethylene glycol and tetraethylene glycol, and polyethylene glycols (PEG) which may have a molecular weight of 200 to 1,000 g/mole or 200 to 700 g/mole; amides, including formamide and monoalkyl formamides and acetamides, wherein the alkyl group may contain 1 to 8 or 1 to 3 carbon atoms, including methyl formamide; dialkylsulfoxide, wherein the alkyl group may contain 1 to 8 or 1 to 3 carbon atoms, including

dimethylsulfoxide (DMSO); sulfones, including sulfolane; hydroxy esters, including lactates, including methyl and ethyl lactate; aminic compounds, including ethylenediamine, monoethanolamine, diethanolamine and triethanolamine; carbonate compounds, including propylene carbonate and glycerol carbonate; and cycloalkanone compounds, including dihydrolevoglucosenone; and wherein the washing solvent a) preferably comprises water.

3. The process according to claim 1 or 2, wherein the extraction solvent b) comprises ammonia or, preferably, one or more organic solvents selected from the group consisting of diols and triols, including monoethylene glycol (MEG), monopropylene glycol (MPG), any isomer of butanediol and glycerol; glycol ethers, including oligoethylene glycols, including diethylene glycol, triethylene glycol and tetraethylene glycol, and monoalkyl ethers thereof, including diethylene glycol ethyl ether; amides, including N-alkylpyrrolidone, wherein the alkyl group may contain 1 to 8 or 1 to 3 carbon atoms, including N-methylpyrrolidone (NMP), formamide and di- and monoalkyl formamides and acetamides, wherein the alkyl group may contain 1 to 8 or 1 to 3 carbon atoms, including dimethyl formamide (DMF), methyl formamide and dimethyl acetamide; dialkylsulfoxide, wherein the alkyl group may contain 1 to 8 or 1 to 3 carbon atoms, including dimethylsulfoxide (DMSO); sulfones, including sulfolane; N-formyl morpholine (NFM); furan ring containing components and derivatives thereof, including furfural, 2-methyl-furan, furfuryl alcohol and tetrahydrofurfuryl alcohol; hydroxy esters, including lactates, including methyl and ethyl lactate; trialkyl phosphates, including triethyl phosphate; phenolic compounds, including phenol and guaiacol; benzyl alcoholic compounds, including benzyl alcohol; aminic

compounds, including ethylenediamine, monoethanolamine, diethanolamine and triethanolamine; nitrile compounds, including acetonitrile and propionitrile; trioxane compounds, including 1,3,5-trioxane; carbonate compounds, including propylene carbonate and glycerol carbonate; and cycloalkanone compounds, including dihydrolevoglucosenone.

4. The process according to any one of claims 1 to 3, wherein step a) comprises multiple steps a) in series:

(i) during step a), at least part of the liquid hydrocarbon feedstock stream is contacted with a sorption agent before the first and second streams are separated in step a); and/or

(ii) between a preceding step a) and a subsequent step a), at least part of the second stream resulting from the preceding step a) is contacted with a sorption agent; and/or

(iii) between steps a) and b), at least part of the second stream resulting from step a) is contacted with a sorption agent; and/or

(iv) the first stream resulting from step b) comprises aliphatic hydrocarbons and heteroatom containing organic compounds and, after step b), at least part of that stream is contacted with a sorption agent.

5. The process according to claim 4, wherein:

(i) part of the heteroatom containing organic compounds is removed from the liquid hydrocarbon feedstock stream by contacting at least part of that stream with a sorption agent during step a) before the first and second streams are separated in step a), and at least part of the treated stream resulting from step (i) is fed to step b); and/or

(ii) part of the heteroatom containing organic compounds is removed from the second stream resulting from a preceding

step a) by contacting at least part of that stream with a sorption agent, and at least part of the treated stream resulting from step (ii) is fed to a subsequent step a); and/or

(iii) part of the heteroatom containing organic compounds is removed from the second stream resulting from step a) by contacting at least part of that stream with a sorption agent, and at least part of the treated stream resulting from step (iii) is fed to step b); and/or

(iv) the first stream resulting from step b) comprises aliphatic hydrocarbons and heteroatom containing organic compounds, and heteroatom containing organic compounds are removed from that stream by contacting at least part of that stream with a sorption agent.

6. A process for the recovery of aliphatic hydrocarbons from plastics, wherein at least part of the plastics comprises heteroatom containing organic compounds, said process comprising the steps of:

(I) cracking the plastics and recovering a hydrocarbon product comprising aliphatic hydrocarbons, heteroatom containing organic compounds and optionally aromatic hydrocarbons; and

(II) subjecting a liquid hydrocarbon feedstock stream, which comprises at least part of the hydrocarbon product obtained in step (I), to the process of any one of claims 1-5.

7. Process for steam cracking a hydrocarbon feed, comprising the steps of:

recovering aliphatic hydrocarbons from a liquid hydrocarbon feedstock stream in a process according to any one of claims 1-6; and

steam cracking a hydrocarbon feed which comprises aliphatic hydrocarbons as recovered in the preceding step.