CLAIMS

1. Process for producing BTX comprising:
   (a) contacting a feedstream comprising C5-C12 hydrocarbons and benzene in the presence of hydrogen with a hydrocracking/hydrodesulphurisation catalyst comprising 0.1-1 wt-% hydrogenation metal in relation to the total catalyst weight and a zeolite having a pore size of 5-8 Å and a silica (SiO_2) to alumina (Al_2O_3) molar ratio of 5-200 under process conditions comprising a temperature of 450-580 °C, a pressure of 300-5000 kPa gauge and a Weight Hourly Space Velocity of 0.1-10 h^{-1} to produce a hydrocracking product stream comprising BTX; and
   (b) separating the BTX from the hydrocracking product stream.

2. The process according to claim 1, wherein the hydrocracking product stream further comprises less than 5 wt-% of methane, preferably less than 4 wt-% methane, more preferably less than 3 wt-% methane, particularly preferably less than 2 wt-% methane and most preferably less than 1 wt-% methane.

3. The process according to claim 1 or 2, wherein the hydrocracking product stream further comprises less than 1 wt-% of non-aromatic C6+ hydrocarbons and preferably less than 0.5 wt-% non-aromatic C6+ hydrocarbons.

4. The process according to any one of claims 1-3, wherein the hydrocracking/hydrodesulphurisation conditions include a temperature of 470-550 °C, a pressure of 600-3000 kPa gauge and a Weight Hourly Space Velocity of 0.2-6 h^{-1} and preferably a temperature of 470-550 °C, a pressure of 1000-2000 kPa gauge and a Weight Hourly Space Velocity of 0.4-2 h^{-1}.

5. The process according to any one of claims 1-4, wherein the hydrogenation metal is at least one element selected from Group 10 of the periodic table of Elements.

6. The process according to any one of claims 1-5, wherein the zeolite is ZSM-5.

7. The process according to any one of claims 1-6, wherein the hydrogenation metal is platinum.

8. The process according to any one of claims 1-7, wherein the hydrocracking/hydrodesulphurisation catalyst comprises a mixture of ZSM-5 and Pt-modified alumina (Pt/Al_2O_3) wherein the weight ratio of ZSM-5 : Pt/Al_2O_3 is between 5:1 and 1:5, preferably between 3:1 and 1:3.

9. The process according to any one of claims 1-8 wherein the feedstream further comprises 10-300 wppm of sulphur and the hydrocracking product stream comprises less than 5 wppm of sulphur.

10 The process according to any one of claims 1-9, wherein the molar ratio of hydrogen to hydrocarbon species (H_2/HC molar ratio) in the reactor feed is at least between 1:1 and 4:1, preferably at least between 1:1 and 3:1and most preferably between 1:1 and 2:1.

11. The process according to any one of claims 1-10, wherein the feedstream comprises pyrolysis gasoline, straight run naphtha, light coker naphtha and coke oven light oil or mixtures thereof.

12. The process according to any one of claims 1-11, wherein the BTX is separated from the hydrocracking product stream by gas-liquid separation or distillation.

13. The process according to any one of claims 1-12, further comprising the step of contacting said BTX with hydrogen under conditions suitable to produce a hydrodealkylation product stream comprising benzene and fuel gas.

14. The process according to claim 13, wherein the hydrodealkylation is performed in the absence of a hydrodealkylation catalyst under hydrodealkylation conditions including a temperature of 600-800 °C, a pressure of 3-10 MPa gauge and a reaction time of 15-45 seconds; or wherein the hydrodealkylation is performed in the presence of a hydrodealkylation catalyst selected from the group consisting of supported chromium oxide catalyst, supported molybdenum oxide catalyst, platinum on silica or alumina and platinum oxide on silica or alumina under hydrodealkylation conditions including a temperature of 500-650 °C, a pressure of 3.5-7 MPa gauge and a Weight Hourly Space Velocity of 0.5-2 h^{-1}.

CLAIMS

1. Process for producing BTX comprising:
   (a) contacting a feedstream comprising C5-C12 hydrocarbons in the presence of hydrogen with a hydrocracking/hydrodesulphurisation catalyst comprising 0.1-1 wt-% hydrogenation metal in relation to the total catalyst weight and a zeolite having a pore size of 5-8 Å and a silica (SiO_2) to alumina (Al_2O_3) molar ratio of 5-200 under process conditions comprising a temperature of 450-580 °C, a pressure of 300-5000 kPa gauge and a Weight Hourly Space Velocity of 0.1-10 h^{-1} to produce a hydrocracking product stream comprising BTX; and
   (b) separating the BTX from the hydrocracking product stream,
   wherein the feedstream comprises benzene and C5-C12 hydrocarbons other than benzene.

2. The process according to claim 1, wherein the hydrocracking product stream further comprises less than 5 wt-% of methane, preferably less than 4 wt-% methane, more preferably less than 3 wt-% methane, particularly preferably less than 2 wt-% methane and most preferably less than 1 wt-% methane.

3. The process according to claim 1 or 2, wherein the hydrocracking product stream further comprises less than 1 wt-% of non-aromatic C6+ hydrocarbons and preferably less than 0.5 wt-% non-aromatic C6+ hydrocarbons.

4. The process according to any one of claims 1-3, wherein the hydrocracking/hydrodesulphurisation conditions include a temperature of 470-550 °C, a pressure of 600-3000 kPa gauge and a Weight Hourly Space Velocity of 0.2-6 h^{-1} and preferably a temperature of 470-550 °C, a pressure of 1000-2000 kPa gauge and a Weight Hourly Space Velocity of 0.4-2 h^{-1}.

5. The process according to any one of claims 1-4, wherein the hydrogenation metal is at least one element selected from Group 10 of the periodic table of Elements.

6. The process according to any one of claims 1-5, wherein the zeolite is ZSM-5.

7. The process according to any one of claims 1-6, wherein the hydrogenation metal is platinum.

8. The process according to any one of claims 1-7, wherein the hydrocracking/hydrodesulphurisation catalyst comprises a mixture of ZSM-5 and Pt-modified alumina (Pt/Al_2O_3) wherein the weight ratio of ZSM-5 : Pt/Al_2O_3 is between 5:1 and 1:5, preferably between 3:1 and 1:3.

9. The process according to any one of claims 1-8 wherein the feedstream further comprises 10-300 wppm of sulphur and the hydrocracking product stream comprises less than 5 wppm of sulphur.

10. The process according to any one of claims 1-9, wherein the molar ratio of hydrogen to hydrocarbon species (H_2/HC molar ratio) in the reactor feed is at least between 1:1 and 4:1, preferably at least between 1:1 and 3:1and most preferably between 1:1 and 2:1.

11. The process according to any one of claims 1-10, wherein the feedstream comprises pyrolysis gasoline, straight run naphtha, light coker naphtha and coke oven light oil or mixtures thereof.

12. The process according to any one of claims 1-11, wherein the BTX is separated from the hydrocracking product stream by gas-liquid separation or distillation.

13. The process according to any one of claims 1-12, further comprising the step of contacting said BTX with hydrogen under conditions suitable to produce a hydrodealkylation product stream comprising benzene and fuel gas.

14. The process according to claim 13, wherein the hydrodealkylation is performed in the absence of a hydrodealkylation catalyst under hydrodealkylation conditions including a temperature of 600-800 °C, a pressure of 3-10 MPa gauge and a reaction time of 15-45 seconds; or wherein the hydrodealkylation is performed in the presence of a hydrodealkylation catalyst selected from the group consisting of supported chromium oxide catalyst, supported molybdenum oxide catalyst, platinum on silica or alumina and platinum oxide on silica or alumina under hydrodealkylation conditions including a temperature of 500-650 °C, a pressure of 3.5-7 MPa gauge and a Weight Hourly Space Velocity of 0.5-2 h^{-1}.