Claims

1. A process for preparing dialkyl 1,4-cyclohexanedicarboxylate in which the two alkyl groups both have at least 2 carbon atoms, the process comprising:

carrying out a ring hydrogenation of a dialkyl terephthalate in which the two alkyl groups both have at least 2 carbon atoms, in the presence of a heterogeneous hydrogenation catalyst, with a hydrogen-containing gas, to form the dialkyl 1,4-cyclohexanedicarboxylate, wherein

the dialkyl terephthalate in the ring hydrogenation has a CO value of less than 0.3 mg KOH/g.

2. The process according to claim 1, wherein each of the two alkyl groups of the dialkyl 1,4-cyclohexanedicarboxylate have 3 to 10 carbon atoms.

3. The process according to claim 1 or 2, wherein the dialkyl terephthalate in the ring hydrogenation is prepared by transesterification of dimethyl terephthalate with an alcohol having at least 2 carbon atoms, or by esterification of terephthalic acid with an alcohol having at least 2 carbon atoms.

4. The process according to claim 3, wherein the alcohol in the transesterification or in the esterification is an alcohol having 3 to 10 carbon atoms.

5. The process according to claim 2 or 4, wherein the dialkyl 1,4-cyclohexanedicarboxylate is diisononyl 1,4-cyclohexanedicarboxylate or di-2-ethylhexyl 1,4-cyclohexanedicarboxylate.

6. The process according to any of claims 1 to 5, wherein the heterogeneous hydrogenation catalyst in the ring hydrogenation comprises a transition metal on a support material.

7. The process according to claim 6, wherein the transition metal is a metal of group 8 of the periodic table of the elements.

8. The process according to claim 6, wherein the support material is selected from the group consisting of activated carbon, silicon carbide, aluminium oxide, silicon dioxide, aluminosilicate, titanium dioxide, zirconium dioxide, magnesium oxide, zinc oxide and mixtures thereof.

9. The process according to claim 8, wherein the support material is titanium dioxide or aluminium oxide.

10. The process according to any of claims 6 to 9, wherein a transition metal content in the heterogeneous hydrogenation catalyst is within a range from 0.1% to 10% by weight.

11. The process according to any of claims 1 to 10, wherein the ring hydrogenation is carried out in at least one hydrogenation unit.

12. The process according to any of claims 1 to 11, wherein a hydrogenation temperature in the ring hydrogenation is within a range from 50 to 250°C.

13. The process according to any of claims 1 to 12, wherein the ring hydrogenation is carried out within a pressure range from 3 to 300 bar.

14. The process according to any of claims 1 to 13, wherein each of the two alkyl groups of the dialkyl 1,4-cyclohexanedicarboxylate have at least 4 carbon atoms.

15. The process according to any of claims 1 to 14, wherein the dialkyl terephthalate in the ring hydrogenation has a CO value of less than 0.1 mg KOH/g.

16. The process according to any of claims 2 to 14, wherein each of the two alkyl groups of the dialkyl 1,4-cyclohexanedicarboxylate have 9 carbon atoms.

17. The process according to any of claims 7 to 16, wherein the transition metal is ruthenium.

18. The process according to any of claims 11 to 17, wherein the ring hydrogenation is carried out in at least two hydrogenation units connected in series, wherein at least one of the at least two hydrogenation units is operated in loop mode.

19. The process according to any of claims 1 to 18, wherein a hydrogenation temperature in the ring hydrogenation is within a range from 80 to 200°C and the ring hydrogenation is carried out within a pressure range from 50 to 200 bar.