Claims

1. An oligomerization catalyst comprising nickel oxide, an Al-containing binder including <0.1% by weight Si in the total composition of the binder, and an amorphous silica-alumina support material, wherein the catalyst has a composition of from 15% to 40% by weight of NiO, from 10% to 30% by weight of Al_2O_3, from 55% to 70% by weight of SiO_2 and from 0.01% to 2.5% by weight of an alkali metal oxide, wherein the percent by weight is based on a total composition of 100% by weight, and wherein the oligomerization catalyst has a ratio of tetrahedrally coordinated aluminium atoms to octahedrally coordinated aluminium atoms of 55 : 45 to 75 : 25, determined by ^{27}Al MAS NMR, wherein the oligomerization catalyst has a specific BET surface area of from 150 to 400 m^2/g, determined by nitrogen physisorption.

2. The oligomerization catalyst according to Claim 1, wherein the oligomerization catalyst has a specific BET surface area of from 220 to 330 m^2/g, determined by nitrogen physisorption.

3. The oligomerization catalyst according to Claim 2, wherein the oligomerization catalyst has mesopores and macropores.

4. The oligomerization catalyst according to Claim 2, wherein the oligomerization catalyst is in the form of granulate.

5. The oligomerization catalyst according to Claim 2, wherein the oligomerization catalyst has an average particle diameter (d50) of from 0.1 mm to 7 mm, determined by imaging methods according to ISO 13322-1 (2004-12-01 version) and ISO 13322-2 (2006-11-01 version).

6. A process for oligomerization of C_3- to C_6-olefins, wherein an olefin-containing feed mixture containing the C_3-to C_6-olefins is passed over a catalyst in a reaction zone, wherein the catalyst according to Claim 2 is used for catalysis of the oligomerization reaction.

7. The oligomerization catalyst according to Claim 1, wherein the oligomerization catalyst has mesopores and macropores.

8. The oligomerization catalyst according to Claim 7, wherein the mesopores of the oligomerization catalyst have an average pore diameter of from 5 to 15 nm, determined by mercury porosimetry.

9. The oligomerization catalyst according to Claim 7, wherein the macropores of the oligomerization catalyst have an average pore diameter of from 1 to 100 µm, determined by mercury porosimetry.

10. The oligomerization catalyst according to Claim 1, wherein the oligomerization catalyst is in the form of granulate.

11. The oligomerization catalyst according to Claim 1, wherein the oligomerization catalyst has an average diameter (d50) of from 0.1 mm to 7 mm, determined by imaging methods according to ISO 13322-1 (2004-12-01 version) and ISO 13322-2 (2006-11-01 version).

12. A process for oligomerization of C_3- to C_6-olefins, wherein an olefin-containing feed mixture containing the C_3- to C_6-olefins is passed over a catalyst in a reaction zone, wherein the catalyst according to Claim 1 is used for catalysis of the oligomerization reaction.

13. The process for oligomerization according to Claim 12, wherein C_3- to C_5-olefins are oligomerized and the olefin-containing feed mixture contains the C_3- to C_5-olefins.

14. The process for oligomerization according to Claim 13, wherein the olefin-containing feed mixture contains less than 2% by weight of branched olefins.

15. The process for oligomerization according to Claim 13, wherein the oligomerization takes place in the liquid phase.

16. The process for oligomerization according to Claim 12, wherein C_4-olefins are oligomerized and the olefin-containing feed mixture contains the C_4-olefins.

17. The process for oligomerization according to Claim 12, wherein the olefin-containing feed mixture contains less than 2% by weight of branched olefins.

18. The process for oligomerization according to Claim 12, wherein the oligomerization takes place in the liquid phase.

19. The process for oligomerization according to Claim 12, wherein the oligomerization is carried out at a pressure of from 10 to 70 bar and a temperature of from 50°C to 200°C, wherein the oligomerization is carried out in the liquid phase the parameters pressure and temperature are chosen such that the reactant stream is in the liquid phase.

20. The process for oligomerization according to Claim 12, wherein the weight-based space velocity (WHSV) of the olefin-containing feed mixture is in the range between 1 h^{-1} and 190 h^{-1}.