Claims

1. Mixed oxide composition comprising a silicon-aluminium mixed oxide powder which is present predominantly or completely in the form of aggregated primary particles and in which

   a) the weight ratio $(Al_2O_3/SiO_2)_{ttl}$ in the overall primary particle is 0.002 to 0.05, preferably 0.003 to 0.015, more preferably 0.005 to 0.01,

   b) the weight ratio $(Al_2O_3/SiO_2)_{surface}$ of the primary particles in a layer close to the surface having a thickness of approx. 5 nm is less than in the overall primary particle and

   c) the BET surface area is 50 to 250 m^2/g, preferably 100 to 200 m^2/g;

   and alkali metal or alkaline earth metal oxides.

2. Mixed oxide composition according to Claim 1, obtainable by treating with an aqueous alkali metal or alkaline earth metal hydroxide solution, where the pH is within a range from 5 to 6.5.

3. ~~Mixed oxide composition comprising a silicon-aluminium mixed oxide powder which is present predominantly or completely in the form of aggregated primary particles and in which~~

   ~~a) the weight ratio $(Al_2O_3/SiO_2)_{ttl}$ in the overall primary particle is 0.002 to 0.05, preferably 0.003 to 0.015, more preferably 0.005 to 0.01,~~

   ~~b) the weight ratio $(Al_2O_3/SiO_2)_{surface}$ of the primary particles in a layer close to the surface having a thickness of approx. 5 nm is less than in the overall primary particle and~~

   ~~c) the BET surface area is 50 to 250 m^2/g, preferably 100 to 200 m^2/g;~~

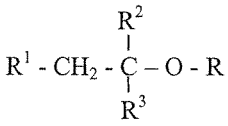
   ~~obtainable by treatment with acidic aqueous solution, where the pH is within a range from 0 to 6, preferably from 1 to 2.5 and more preferably from 2 to 2.5.~~

4. ~~Mixed oxide composition according to Claim 3, characterized in that the pH is adjusted by means of a phosphorus source.~~

~~5. Mixed oxide composition according to Claim 4, characterized in that the phosphorus source is selected from phosphoric acid, phosphonic acid, phosphinic acid, polyphosphoric acid, dihydrogenphosphate.~~

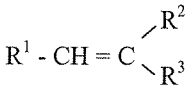
~~6. Mixed oxide composition according to any one of the preceding claims, characterized in that binders, temporary assistants and fixatives are added to produce shaped bodies in a shaping process.~~

~~7.~~3. Use of a mixed oxide composition according to any of the preceding claims as a catalyst for cleaving a starting compound of the formula **II**



II

to isoolefins of the formula **I**



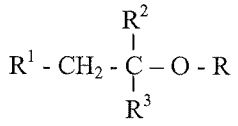
I

and a compound of the formula **III**

R – OH **III**

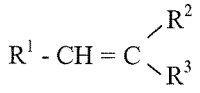
where the R radical in the formulae **I** to **III** is H or an alkyl radical having one or two carbon atom(s), the R1 radical is H, or a methyl or ethyl radical and the R2 and R3 radicals are each methyl or ethyl radicals, where the R2 and R3 radicals may be the same or different.

8 4. Process for cleaving a starting compound of the formula II



II

to isoolefins of the formula I



I

and a compound of the formula III

R – OH III

where the R radical in the formulae I to III is H or an alkyl radical having one or two carbon atom(s), the R1 radical is H, or a methyl or ethyl radical and the R2 and R3 radicals are each methyl or ethyl radicals, where the R2 and R3 radicals may be the same or different, characterized in that a mixed oxide composition according to the preceding claims is used as a catalyst.

9 5. Process according to Claim 8 4, characterized in that the catalyst used is a mixed oxide composition which is produced by flame hydrolysis and has the following composition:

a. silicon: 50 – 99.9% by mass (calculated as SiO_2),
b. aluminium: 0.1 – 50% by mass, preferably 0.1 – 20% by mass, more preferably 1 – 11% by mass (calculated as Al_2O_3),
c. alkali metal: 0 – 15% by mass (calculated as M_2O) or alkaline earth metal: 0 – 30% by mass (calculated as MO).

10 6. Process according to Claim 8 4 or 95, wherein methyl tert-butyl ether is used as the starting material.

11 7. Process according to Claim 8 4 or 95, wherein tert-butyl alcohol is used as the starting material.

12.8. Process according to Claim 117, wherein tert-butanol in an azeotropic mixture with water is used as the starting material.

13.9. Process according to Claim 8–4 or 95, wherein the temperature and is within a range from 110 to 450°C.

14.10. Process according to Claim 8–4 or 95, wherein the pressure is within a range from 0.1 to 2 MPa(abs).