Claims

1. A method for producing a lubricant which comprises the following steps:
   a) preparation of an overbased calcium sulfonate which comprises the following steps:
   - dissolving at least one mono-, di- or tri-alkylbenzene sulfonic acid, wherein at least one alkyl group is a (C3-C30)-alkyl group, in at least one ester composition, wherein the ester composition comprises at least one ester;
   - admixing calcium hydroxide and calcium oxide;
   - heating the mixture to a temperature in the range from 30 °C to 90 °C and introducing carbon dioxide into the mixture, wherein the mixture is adjusted to a base number (TBN) of at most 550 mg KOH/g;
   b) conversion of the overbased calcium sulfonate from the vaterite form into the calcite form which comprises the following steps:
   - adjusting the mixture to a water content in the range of 2 % by wt. to 20 % by wt.;
   - heating the mixture to a temperature in the range of 80 °C to 105 °C, wherein the mixture is adjusted to a base number of no more than 450 mg KOH/g; and
   c) production of a calcium sulfonate grease by heating the mixture to a temperature in the range of 90 °C to 200 °C.

2. The method according to claim 1, characterized in that at least one alkyl group of the mono-, di- or tri-alkylbenzene sulfonic acid is a (C10-C18)-alkyl group.

3. The method according to claim 1 or 2, characterized in that the ester composition comprises a synthetic ester and/or a native ester, wherein the ester composition has a viscosity in the range of 2 mm^2/s to 1,200 mm^2/s, preferably 10 mm^2/s to 500 mm^2/s.

4. The method according to one of claims 1 to 3, characterized in that the mixture in step a) is adjusted to a base number in the range of 150 to 550 mg KOH/g, preferably 210 to 450 mg KOH/g or 320 to 420 mg KOH/g, in particular 211 to 399 mg KOH/g.

5. The method according to one of claims 1 to 4, characterized in that the mixture in step b) is adjusted to a base number in the range of 50 to 450 mg KOH/g, preferably 70 to 350 mg KOH/g or 100 to 250 mg KOH/g, in particular 80 to 220 mg KOH/g.

6. The method according to one of claims 1 to 5, characterized in that the mixture in step a) is heated to a temperature in the range of 35 °C to 85 °C or 45 °C to 60 °C, in particular 40 °C to 82 °C.

7. The method according to one of claims 1 to 6, characterized in that the mixture in step b) is heated to a temperature in the range of 87 °C to 102 °C or 85 °C to 100 °C, in particular 88 °C to 99 °C.

8. The method according to one of claims 1 to 7, characterized in that the mixture in step c) is heated to a temperature in the range of 100 °C to 180 °C or 110 °C to 170 °C, in particular 125 °C to 160 °C.

9. The method according to one of claims 1 to 8, characterized in that the water content of the mixture in step b) is adjusted to a content in the range of 5 % by wt. to 18 % by wt., in particular 7 % by wt. to 15 % by wt..

10. The method according to one of claims 1 to 9, characterized in that calcium hydroxide and/or at least one mono-, di- or tri-alkylbenzene sulfonic acid, wherein at least one alkyl group is a (C3-C30) alkyl group, and/or at least one ester composition, wherein the ester composition comprises at least one ester, is admixed to the mixture in step b).

11. A mineral oil-free grease which comprises at least one ester composition comprising at least one ester being free of any mineral oil, calcium carbonate and at least one overbased mono-, di- or tri-alkylbenzene sulfonate, wherein at least one alkyl group of the mono-, di- or tri-alkylbenzene sulfonate is a (C3-C30) alkyl group.

12. The grease according to claim 11, characterized in that it comprises 30 % by wt. to 80 % by wt. of the ester composition, 5 % by wt. to 20 % by wt. calcium carbonate and 5 % by wt. to 25 % by wt. of the overbased mono-, di- or tri-alkylbenzene sulfonate.

13. The grease according to claim 11 or 12, characterized in that it comprises 50 % by wt. to 65 % by wt. of the ester composition, 10 % by wt. to 15 % by wt. calcium carbonate and 12 % by wt. to 20 % by wt. of overbased mono-, di- or tri-alkylbenzene sulfonate.