

Claims

1. Process for the manufacturing of alkanesulfonic acid, $R-SO_3H$, wherein R stands for C_1-C_4 alkyl, by reaction of an anhydride with sulfuric acid and an alkane, $R-H$, in the presence of a peroxide starter at ambient temperature or higher and under pressure higher than ambient pressure.
2. Process for the manufacturing of alkanesulfonic acid, $R-SO_3H$, according to claim 1, in which the use of pure SO_3 or oleum is avoided.
3. Process for the manufacturing of alkanesulfonic acid, $R-SO_3H$, according to claim 1 or 2, wherein the anhydride is selected from anhydrides other than SO_3 .
4. A process according any one of claims 1, 2 or 3, wherein the starter is chosen from the group consisting of aqueous hydrogen peroxide, monomethylperoxydisulfate and salts thereof, dimethylperoxodisulfate and salts thereof, peroxodisulfuric acid and salts thereof, and peroxomonosulfuric acid and salts thereof.
5. A process according to any one of claim 1 to 4, wherein the anhydride is chosen from the group consisting of RSO_2OSO_2R , anhydrides of mineral acids and anhydrides of organic acids, preferably from the group consisting of RSO_2OSO_2R , anhydrides of mineral acids other than SO_3 and anhydrides of organic acids, more preferably chosen from the group consisting of RSO_2OSO_2R and anhydrides of organic acids .
6. A process according to claim 5, wherein the organic anhydride is an anhydride of the general formula $R-(C=O)-O-(C=O)-R'$, where R' has the same meaning as R, and R and R' can be the same or different from each other.
7. A process according to any one of claims 1 to 6, comprising the following steps:
 - 1) adding a peroxide starter to a mixture of the anhydride and sulfuric acid,
 - 2) contacting the alkane to said mixture at a pressure in the range between 10 and 120 bar,
 - 3) setting the reaction temperature in the range of 20 to 80°C for 1 to 30 hours.
8. A process according to any one of claims 1 to 7, wherein R stands for methyl.

9. A process according to any one of claims 1 to 8, wherein the molar ratios of anhydride to sulfuric acid is chosen in the range of from 0.001 : 1 to 1:1.
10. A process according to any one of claims 1 to 9, wherein the molar ratios of anhydride to sulfuric acid is chosen in the range of from 0.005 : 1 to 0.80 : 1.
11. A process according to any one of claims 1 to 10, wherein the molar ratios of anhydride to sulfuric acid is chosen in the range of from 0.01 : 1 to 0.70 : 1.
12. A process according to any one of claims 1 to 11, wherein R-SO₃H is added as a further starting material.
13. A process according to any one of claims 1 to 12, wherein SO₃ is added as a further starting material.
14. Use of at least one anhydride, preferably an anhydride other than SO₃, in a process for the manufacturing of alkanesulfonic acid, R-SO₃H, wherein R stands for C₁-C₄ alkyl, by reaction with sulfuric acid and an alkane, R-H, in the presence of a starter, preferably peroxide starter, at ambient temperature or higher and under pressure higher than ambient pressure.
15. Use according to claim 14, wherein the starter is chosen from the group consisting of aqueous hydrogen peroxide, monomethylperoxydisulfate and salts thereof, dimethylperoxydisulfate and salts thereof, peroxydisulfuric acid and salts thereof, and peroxomonosulfuric acid and salts thereof.
16. Use according to claim 14 or 15, wherein the anhydride is chosen from the group consisting of RSO₂OSO₂R, anhydrides of mineral acids and anhydrides of organic acids, preferably from the group consisting of RSO₂OSO₂R, anhydrides of mineral acids other than SO₃ and anhydrides of organic acids, more preferably chosen from the group consisting of RSO₂OSO₂R and anhydrides of organic acids.
17. Use according to any one of claims 14, 15 or 16, wherein the anhydride is selected from anhydrides except SO₃.