

UNITED STATES PATENT OFFICE

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WETTING AGENT

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4 Claims. (Cl. 260-401)

Our present invention relates to wetting agents. In U. S. Patent No. 1,867,022 wetting agents are described consisting of salts of alkylated naphthylene sulfonic acids and certain ammonium bases. Salts of the same ammonium bases with other capillary active sulfonic acids have the same wetting effect. It has now been found that the raising of the wetting power of organic sulfonic acids depends largely upon the structure of the added ammonium base.

According to our present invention products of a particular wetting power are obtained by forming watersoluble salts derived from capillary active organic sulfonic acids and such ammonium bases as contain an aliphatic radicle consisting of a straight or branched chain of about 5 to 11 carbon atoms. This radicle may be linked with the pentavalent nitrogen atom either directly or by any bridge (ether-, ester-, carboxylic acid amido group or the like). Instead of the aliphatic radicle consisting of a chain likewise cycloaliphatic or araliphatic radicles may be present in the molecule of the ammonium bases (in the latter case the carbon atoms contained in the ring of the aryl residue are not to be counted in defining the length of the araliphatic chain.) The other radicles attached to the pentavalent nitrogen atom may be either short (not capillary active) aliphatic or heterocyclic residues. Such ammonium bases correspond in form of their salts with the general formula:



wherein R₁, R₂, and R₃ stand for aliphatic hydrocarbon radicles of a low molecular weight, Y stands for an anion and X for a radical selected from the class consisting of aliphatic, cycloaliphatic and araliphatic groups, said group, when aliphatic, being a chain with from 5 to 11 carbon atoms and, when araliphatic, being substituted by alkyl radicals, the sum of whose carbon atoms ranges from 5 to 11.

As to the type of the organic sulfonic acids used as anions, alkylated aromatic sulfonic acids and sulfonation products of unsaturated fatty or hydroxy fatty acids may be used, i. e. substances, which are useful as is known as wetting but not as washing agents. Besides alkylated naphthalene sulfonic acids there are particularly valuable sulfonation products of unsaturated fatty or hydroxy fatty acids, the carboxylic acid group of

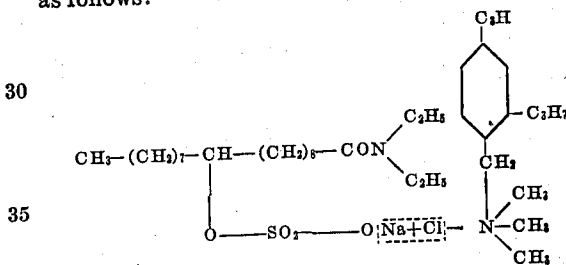
which is protected by esterification or amidination. As it is known the sodium salts thereof have an excellent wetting power. But when converted into the present salts of ammonium bases the wetting power is essentially increased. The active anion component may be advantageously used in excess, whereby easily soluble substances, which are difficultly separable by adding salt, are obtained.

In order to further illustrate our invention the following examples are given, the parts being by weight.

Example 1

To 100 parts of a sulfonation product of oleic acid diethylamide of 35% fatty strength a solution of 12 parts of an ammonium salt are added, which is obtained by acting with trimethylamine on di-isopropylbenzylchloride. By adding sodium chloride the salt of both components is separated and may be transformed into a state free from salt and water by extracting e. g. with chloroform and evaporating. The product is a resinous easily watersoluble substance of an excellent wetting power.

The course of the reaction may be illustrated as follows:

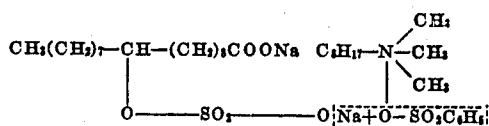


When starting from triisopropylbenzylchloride or when condensing the chlorides with pyridine or methylpiperidine instead of trimethylamine very similar quaternary bases are obtained.

Example 2

An aqueous solution of 100 parts of the sodium salt of the sulfuric acid ester of the hydroxystearic acid is mixed with an aqueous solution of 70 parts of an ammonium base which is obtainable by acting on benzenesulfochloride and an excess of trimethylamine with n-octanol with the addition of an organic diluent. The formed wetting substance is isolated as described in the foregoing example.

The course of the reaction may be illustrated as follows:

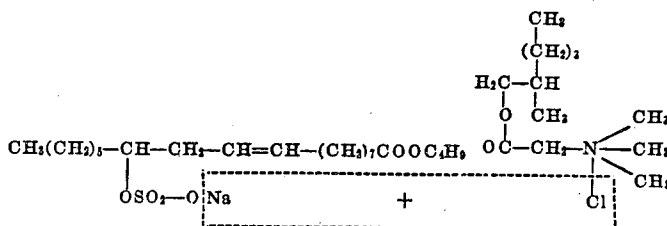


It is a remarkable fact that the formed salt is an excellent wetting agent, whereas both components as such exhibit no or only a very little wetting effect.

Example 3

100 parts of a solution of sulfonated ricinoleic acid butylester of 40% strength are mixed with 10 parts of an ammonium base which is obtainable by condensing the chloracetic acid isoheptylester with trimethylamine. The formed wetting agent is isolated as described in the foregoing examples.

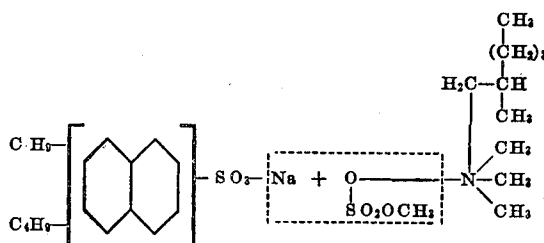
The course of the reaction may be illustrated as follows:



In this case the very good wetting effect of the sulfonated ricinoleic acid butylester is essentially increased by the formation of the salt with the ammonium base.

Example 4

A mixture of 326 parts of the sodium salt of a dibutylated naphthalene sulfonic acid, 269 parts of isoheptyltrimethylammonium methylsulfonate, obtained by peralkylating isoheptylamine with dimethylsulfate, a little quantity of water and a sodium chloride solution is warmed whereby the salt of both components is formed according to the following equation:



The salt may be purified in the same manner as the products of the foregoing examples for instance by treatment with chloroform with the addition of a little quantity of alcohol and by evaporation of the solvent. The wetting effect is very good and surpasses substantially that of the first component.

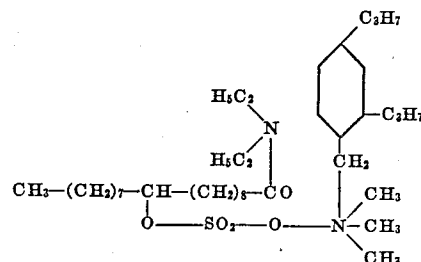
We claim:

1. Wetting agents, consisting of a watersoluble salt formed by interaction of a capillary active sulfonated organic compound selected from the class consisting of alkylated naphthalene sulfonic acid and the sulfonation products of unsaturated and hydroxy fatty acids, the carboxylic acid group of which is protected, and of a quaternary ammonium salt of the general formula:

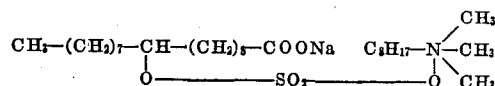


wherein R₁, R₂ and R₃ stand for aliphatic hydrocarbon radicles of a low molecular weight, Y stands for an anion and X for a radical selected from the class consisting of aliphatic, cycloaliphatic and araliphatic groups, said group, when aliphatic, being a chain with from 5 to 11 carbon atoms and, when araliphatic, being substituted by alkyl radicals, the sum of whose carbon atoms ranges from 5 to 11.

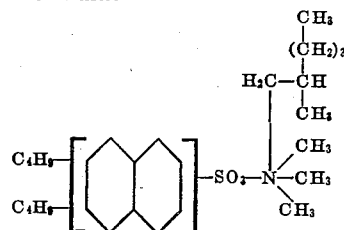
2. A wetting agent consisting of a watersoluble salt of the formula:



3. A wetting agent consisting of a watersoluble salt of the formula:



4. A wetting agent consisting of a watersoluble salt of the formula:



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