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PROCESS AND REAGENT FOR TREATING EMULSIONS

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This invention relates to a process of treating the crude petroleum emulsions frequently encountered in the oil fields and composed primarily of mineral oil and water or brine, to separate from them commercially acceptable petroleum. The invention also relates to reagents for accomplishing this separation.

There are three primary and interrelated factors in breaking these emulsions. In the first place, it is necessary to have a reagent which will effect the balance of the emulsion in question to permit the oil to be separated out by settling, filtering, or centrifuging or the like. In order to get good commercial results it is necessary that this reagent be so constituted that it can be rapidly and readily distributed throughout the emulsion. Certain emulsions seem to break rather readily with a given reagent but coalesce, settle or separate relatively slowly or incompletely. This is very undesirable from the commercial standpoint.

Therefore, a good emulsion breaking reagent must have the proper unbalancing effect upon the emulsion, must be susceptible to rapid distribution throughout the emulsion, and must cause the emulsion when broken to coalesce rapidly. The reagent of this invention provides these advantages and has these characteristics.

The primary unbalancing or emulsion breaking component of the reagent is a petroleum sulphonic body of the type found in sludges, particularly those sludges resulting from the refining of medicinal white oils or the lighter colored technical oils with strong sulphuric acid, fuming sulphuric acid, and/or sulphur trioxide. These sludge layer petroleum sulphonates or mineral oil sulphonates are readily water soluble and have a breaking effect on emulsions whether used in the acid phase, or as is more conventional, in the form of sodium salts. Salts other than sodium salts may be used if desirable.

It is often likewise desirable to use oil layer, that is, oil soluble petroleum sulphonates of the type derived from the refining operations outlined above in combination with these sludge layer or predominantly water soluble sulphonates. In many cases the proportion of these sulphonates can be adjusted to meet the requirements of the particular emulsion and a satisfactory break obtained. Often though, it is desirable to increase the facility with which the reagent can be dispersed throughout the emulsion or to accelerate the coalescence of the components of the emulsion.

We have found that one class of bodies in combination with the above specified sulphonates, and particularly the sludge layer sulphonates, is highly useful to produce both of the advantages outlined. These bodies comprise the hydroxy aromatic compounds having boiling points above 205° C. and molecular weights above 110. By the term "hydroxy aromatic compounds having boiling points above 205° C. and molecular weights above 110" we refer to compounds such as the various isomeric xylenols, various ethyl hydroxy benzene derivatives and other hydroxy benzene or hydroxy polycyclic aromatic compounds boiling above 205° C. which may or may not have alkyl or aryl substituents in the ring or rings. These compounds are available in that fraction derived from coal tar known commercially as high boiling tar acids.

Since the exact composition of these high boiling tar acids has not been definitely determined, owing to the complex nature of the material, we prefer to be limited only by the term "hydroxy aromatic compounds, boiling above 205° C.", rather than by the specific chemical compounds included in this classification. These compounds will therefore hereafter be designated as high boiling tar acids.

When incorporated with petroleum sulphonates the high boiling tar acids seem to act as dispersing agents to incorporate the sulphonates throughout the emulsion and after the emulsion has broken they act as an agglutinating agent and accelerate the coalescence of the water particles and decrease the time required for the complete separation of the components of the emulsion.

The high boiling tar acids also possess greater solvent ability for the mineral oil

sulphonates than ordinary ortho, meta or para cresol and by their use it is possible to produce formulæ of low viscosity which are more easily handled and more easily dispersed in the oil to be treated.

The high boiling tar acids also form homogeneous mixtures with the other solvents, which are employed to reduce or control the viscosity of the finished formula, such as alcohol and kerosene. The quantity of solvent used is governed by the viscosity and activity desired in the finished formula.

The following formula provides one example of the reagent of this invention, though we wish to be limited only by the claims:

	Parts
Water soluble petroleum sulphonates	37.5
Oil soluble petroleum sulphonates	37.5
High boiling tar acids	10.0
Ethyl alcohol	15.0

The emulsion is usually treated with the reagent of this nature in the proportion of 1 part reagent to a thousand parts emulsion at a temperature usually approximating 150° F., though lower temperatures may be used if the emulsion is easily broken. After coalescence has proceeded to a substantial degree, the components of the emulsion can be separated by filtering centrifuging, or the emulsion simply may be allowed to stand until complete stratification takes place and one of the layers is drawn off.

Having described our invention, we desire to be limited only by the ensuing claims:

1. A reagent adapted to break petroleum emulsions, comprising, sludge layer petroleum sulphonic bodies, oil soluble petroleum sulphonic bodies, and high boiling tar acids of the type specified.

2. A reagent adapted to break petroleum emulsions, comprising, sludge layer petroleum sulphonic bodies, oil soluble petroleum sulphonic bodies, high boiling tar acids of the type specified, and a viscosity reducer.

3. A reagent adapted to break petroleum emulsions, comprising, sludge layer petroleum sulphonic bodies, oil soluble petroleum sulphonic bodies, high boiling tar acids of the type specified, and alcohol.

4. A process of breaking petroleum and water emulsions, comprising, treating said emulsions with relatively small quantities of a reagent, comprising, sludge layer petroleum sulphonic bodies, oil soluble petroleum sulphonic bodies, and high boiling tar acids of the type specified at a temperature approximating 150° F. and then separating the components of the emulsion.

5. A process of breaking petroleum and water emulsions, comprising, treating said emulsions with relatively small quantities of a reagent, comprising, sludge layer petroleum sulphonic bodies, oil soluble petroleum sulphonic bodies, high boiling tar acids of the type specified, and a viscosity reducer, at a temperature approximating 150° F. and then separating the components of the emulsion.

6. A process of breaking petroleum and water emulsions, comprising, treating said emulsions with relatively small quantities of a reagent, comprising, sludge layer petroleum sulphonic bodies, oil soluble petroleum sulphonic bodies, high boiling tar acids of the type specified, and alcohol, at a temperature approximating 150° F. and then separating the components of the emulsion.

In witness whereof, we hereunto subscribe our names.

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