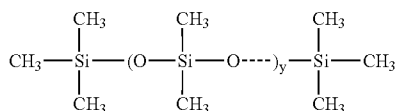






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b. an oil phase selected from the group consisting of silicone fluid conforming to the following structure;



wherein;

y is an integer ranging from 2 to 2,000;

and

hydrocarbon conforming to the following structure:



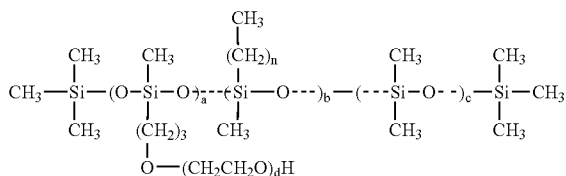
wherein

z is an integer ranging from 20 to 60;

and

(c) water.

Critical to the performance is the storage stable silicone emulsifier conforming to the following structure:



wherein;

a is an integer ranging from 2 to 10;

b is an integer ranging from 2 to 10 such that b/a > or = 1, but less than 2.5;

c is (a+b) times x, wherein x is 1.5 to 2.5;

d is an integer ranging from 6 to 12;

n is an integer ranging from 9 to 15.

The prior art compounds did not recognize that the ratio of the sum of the number of water soluble groups (a) and number of alkyl soluble groups (b) to silicone soluble group (c) is critical to performance. Specifically, when the b value is related to the "a" value such that b/a > or = 1, but less than 2.5, a clear homogeneous emulsifier results that does not settle with time. When attaching polyether and alkyl groups to a molecule through hydrosilation, the groups attach in a random fashion. So although a silicone backbone may have ten molar reactive sites to hydrosilate with (SiH groups), if you react 2 molar ratio of polyether groups and eight alkyls (where b/a is >2.5), they will attach in a random fashion, and statistically you may end up with a product that may have only alkyl groups attached and no polyether groups. Therefore, you will end up with some molecules which contain only alkyl groups and no polyether groups and will not act as an emulsifier. As well, in hydrosilation reactions, excess of polyether or alkyl monomers must be used to get the reaction to completion. If excess polyether is used, any unreacted polyether will be insoluble in the corresponding

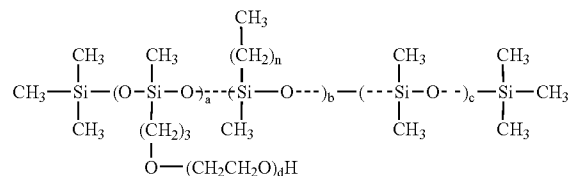
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fluid where b/a > 2.5, and can haze out and over time and form a separate phase, which can again alter the performance of the product in making emulsions. This separation causes major problems in the preparation of reproducible emulsions. The separation occurs in the drums containing product, and if the product is not warmed and agitated can result in addition of an emulsifier layer that is very different from the warm agitated emulsifier. This results in the inability to get good batch to batch emulsions. We have surprisingly found that by selection of the correct ratio of compounds an emulsifier that provides outstanding batch to batch consistency is produced.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Examples

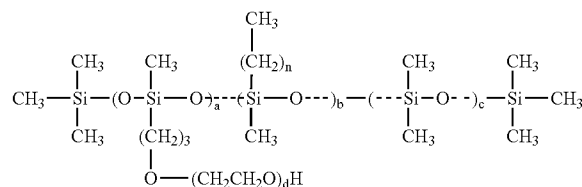
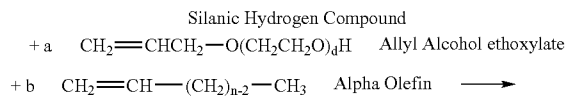
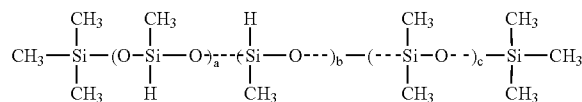
The compounds of the present invention conform to the following structure:



The "a" section of the molecule comes from the reaction of a silanic hydrogen containing polymer with an allyl alcohol alkoxylate.

The "b" section of the molecule comes from the reaction of a silanic hydrogen containing polymer with an alpha olefin.

Reaction Sequence

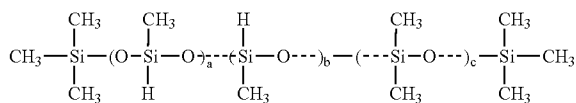


Product

Examples

Silanic Hydrogen Compounds

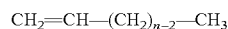
Silanic hydrogen compounds are commercially available from Siltech Corporation in Toronto Canada and conform to the following structure:



Example	a	b	c
1	5	5	20
2	8	12	40
3	3	7	25
4	6	6	25
5	5	10	30

Alpha Olefin

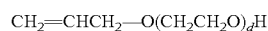
Alpha olefin compounds are available from a variety of sources including Chevron Chemical and conform to the following structure:



Example	n Value
6	9
7	11
8	13
9	15

Allyl Alcohol Ethoxylate

The allyl alcohol ethoxylate useful in the preparation of the compounds of the present invention are commercially available from a variety of sources and conform to the following structure;



Example	d
10	6
11	8
12	10
13	12

Alkyl Dimethicone Compounds

In a 5 liter flask equipped with thermometer, nitrogen inlet, reflux condenser and mechanical stirrer, is added the specified number of grams of the specified Silanic hydrogen compound (Examples 1-5), next add the specified number of grams of the specified alpha olefin (Examples 6-9) and the specified number of grams of the specified allyl alcohol ethoxylate (Examples 10-13), finally add 800 grams of isopropanol. Heat to 80° C. Add 0.008 grams of Karstedt catalyst while at 80 C. The reaction was run at 80 C while monitoring the SiH group at 80° C. by use of IR. When the SiH group becomes vanishingly small, the IPA is stripped off using vacuum. The final product is the silicone compound of the present invention and is used without additional purification.

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60

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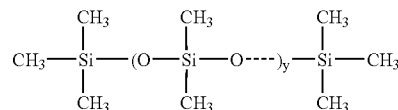
Ex-ample	Silanic Hydrogen		Alpha Olefin		Allyl Alcohol Ethoxylate	
	Example	Grams	Example	Grams	Example	Grams
14	1	2123.0	6	141.0	10	321.0
15	2	4108.0	7	169.0	11	409.0

Ex-ample	Silanic Hydrogen		Alpha Olefin		Allyl Alcohol Ethoxylate	
	Example	Grams	Example	Grams	Example	Grams
16	3	2483.0	8	197.0	12	497.0
17	4	2596.0	9	225.0	13	585.0
18	5	3120.0	6	141.0	10	321.0

Oil Phases

Silicone Compounds:

Silicone compounds useful as oil phases are commercially available and conform to the following structure;



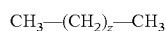
wherein;

y is an integer ranging from 2 to 2,000;

Example	y
19	2
20	5
21	100
22	1000
23	2000

Hydrocarbons

The hydrocarbons useful in the current invention are commercially available from a variety of sources, including the Penreco division of Penzoil. The hydrocarbon compounds conform to the following structure:



wherein

z is an integer ranging from 20 to 60;

Example	z
24	20
25	40
26	50
27	60

Emulsion—General Procedure

The preparation of the desired W/O emulsion is accomplished by adding the products of the present invention (Examples 14-18) to the specified number of grams of the

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specified oil with good mixing. Next the water is added slowly with good mixing. The resulting milky white product was passed through a Matin Gaulin homogenizer at 2,000 psi pressure.

The W/O emulsions obtained with the copolymers of the present invention have the required high stability and maintain this over a wide temperature range and at relatively low emulsifier concentrations. As a result of the low emulsifier content, the properties of the oily phase are accordingly only slightly affected by the emulsifier. This is particularly important for cosmetic or pharmaceutical applications. The W/O emulsions prepared with the inventive emulsifiers are also suitable for technical purposes, for example, for use as preservatives and polishes for furniture, lacquered metal or floors.

Emulsions

Example	Emulsifier		Oil		Water
	Example	Grams	Example	Grams	Grams
28	14	1.0	24	40.0	59.0
29	15	2.0	25	40.0	58.0
30	16	4.0	26	60.0	36.0
31	17	3.0	27	60.0	37.0
32	18	3.0	25	70.0	27.0
33	14	5.0	19	65.0	30.0
34	15	3.0	20	85.0	12.0
35	16	5.0	21	67.0	28.0
36	17	1.0	22	60.0	39.0
37	18	2.5	23	70.0	27.5

Emulsion Stability

The stability of the emulsion was rated on a scale of 1-5, with 1 being an immediate split and 5 being stable longer than 48 hours.

Example	Rating
28	5
29	4
30	5
31	5
32	4
33	4
34	5
35	5
36	5
37	4

As can be easily seen from the above, the compounds of the present invention are outstanding emulsifiers for making water in oil emulsions. All emulsifiers (examples 28-37) are clear, water colored products that remain homogeneous at 20° C., with on separation or flock.

While the illustrative embodiments of the invention have been described with particularity, it will be understood that various other modifications will be apparent to and can be readily made by those skilled in the art without departing from the spirit and scope of the invention. Accordingly, it is not intended that the scope of the claims appended hereto be

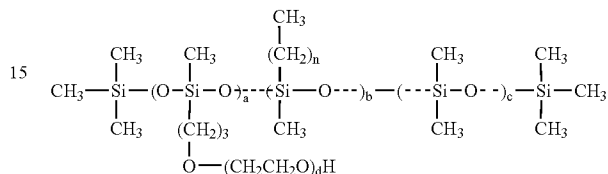
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limited to the examples and descriptions set forth hereinabove but rather that the claims be construed as encompassing all the features of patentable novelty which reside in the present invention, including all features which would be treated as equivalents thereof by those skilled in the art to which the invention pertains.

We claim:

1. A water in oil emulsion, which comprises:

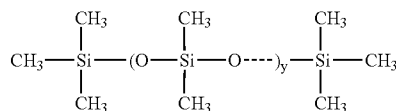
A. a silicone emulsifier conforming to the following structure:



wherein;

- a is an integer ranging from 2 to 10;
- b is an integer ranging from 2 to 10 such that b/a > or = 1, but less than 2.5;
- c is (a+b) times x, wherein x is 1.5 to 2.5;
- d is an integer ranging from 6 to 12;
- n is an integer ranging from 9 to 15;

B. an oil phases selected from the group consisting of silicone fluid conforming to the following structure;



wherein;

- y is an integer ranging from 2 to 2,000;
- and hydrocarbon conforming to the following structure:



wherein

- z is an integer ranging from 20 to 60;

and

C. water;

wherein the concentration of the silicone emulsifier ranges from 1% to 5% by weight, the concentration of the oil phase ranges from 40% to 85% and the concentration of water ranges from 59.5% to 12% by weight.

- 2. A water in oil emulsion of claim 1 wherein n is 11.
- 3. A water in oil emulsion of claim 2 wherein said oil phase is a silicone fluid.
- 4. A water in oil emulsion of claim 2 wherein said oil phase is a hydrocarbon.
- 5. A water in oil emulsion of claim 1 wherein n is 15.
- 6. A water in oil emulsion of claim 5 wherein said oil phase is a silicone fluid.
- 7. A water in oil emulsion of claim 5 wherein said oil phase is a hydrocarbon.

\* \* \* \* \*