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SOLVENTLESS SILICONE RESINS

George W. Holbrook, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich., a corporation of Michigan

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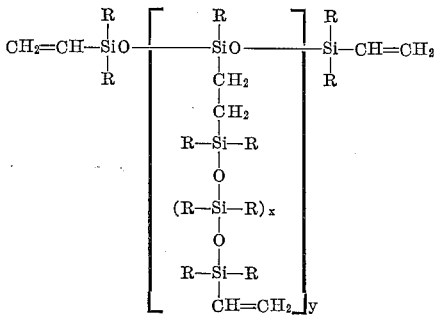
13 Claims. (Cl. 260—46.5)

This invention relates to a new solventless silicone polymer.

An object of the present invention is to provide silicone polymers which do not require a solvent either during the preparation or when used. Another object is to provide silicone polymers which can have their physical and chemical properties predetermined by design. Unlike prior art silicone polymers in which the chemical and physical properties are happenstance, and in which the silicone polymers have properties dependent upon the nature of the preparation, the properties of the present silicone polymers are virtually independent of the nature of the preparation and are dependent upon the structural arrangement which can readily be regulated.

Another object of this invention is to provide essentially transparent silicone polymers. Other objects and advantages will become apparent from the following description and appended claims.

The present invention provides a silicone polymer of the general formula

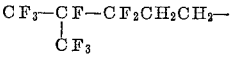


wherein R is a monovalent organic radical selected from the group consisting of alkyl radicals, aryl radicals, cycloalkyl radicals and $R_fCH_2CH_2$— radicals where R_f is a perfluoroalkyl group having from 1 to 10 carbon atoms, x has an average value of at least 3 and y has an average value of at least 3.

The monovalent organic radicals, R, can be alkyl radicals such as methyl, ethyl, propyl, butyl, isobutyl and octadecyl radicals; aryl radicals such as phenyl, naphthyl, xylyl, xenyl and β-phenylethyl radicals; cycloalkyl radicals such as cyclohexyl and cyclopentyl radicals, or radicals of the formula $R_fCH_2CH_2$— wherein R_f is a perfluoroalkyl radical having from 1 to 10 carbon atoms, such as

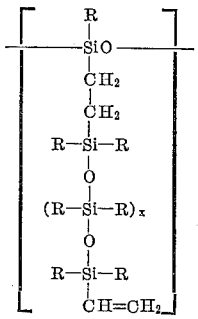
$CF_3CH_2CH_2$—, $CF_3CF_2CH_2CH_2$—, $CF_3(CF_2)_9CH_2CH_2$—

and



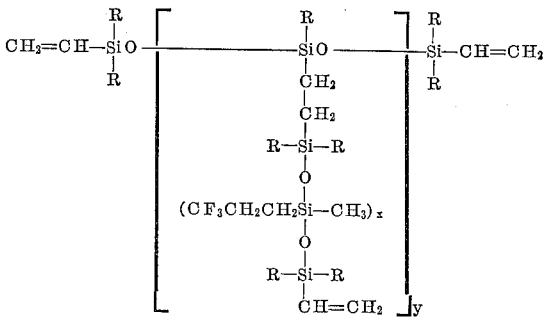
The silicone polymer of this invention as described by the above formula contains at least three siloxane units of the unit formula R_2SiO, therefore x has an average value of at least 3. Only the ability to handle the polymer during the preparation and when used will determine the upper limit of x. The value of x can be 5,000 or more. Preferably, x has an average value from 3 to 500.

The silicone polymer as described above also contains at least three siloxane units of the unit formula



therefore y has an average value of at least 3. The maximum value of y can be 5,000 or more. Preferably, y has an average value from 3 to 500.

The most preferred silicone polymers of this invention which have excellent solvent resistance are polymers of the formula



wherein R is defined above and is preferably methyl, x has an average value of at least 3 and y has an average value of at least 3. The most preferred average value of x is from 3 to 50 and the most preferred average value of y is from 3 to 100.