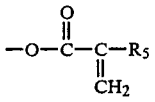
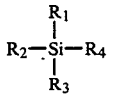
atoms and where at least one of R_1–R_4 is alkyl, aryl, aralkyl, alkaryl having from 1 to about 30 carbon atoms and being substituted with at least one group having formula II:



II.

where R_5 is H, alkyl, alkenyl or phenyl having from 1 to about 6 carbon atoms. Of these acrylosilanes, preferred species include those where R_1–R_3 are the same or different and may be methoxy, ethoxy, propoxy, etc., methoxyethoxy, butoxyethoxy, etc., methyl, ethyl, propyl, etc., and where R_4 may be acryloxyethyl, acryloxypropyl, methacryloxypropyl, methacryloxybutyl, etc. Those skilled in the art will appreciate that pluralities of such acrylic substituents may be appended to R_4 and that others of the substituents on silicon, i.e. R_1–R_3, may also be so substituted. Species such as 3-methacryloxypropyltrimethoxysilane and methacryloxypropyltris(methoxyethoxy)silane have been found to be most preferred for use in certain embodiments of this invention.

Another family of silane species which is useful in the practice of this invention include those light polymerization silanes which have non-acrylic photochemically reactive ethylenic unsaturations. Accordingly, such family may be represented by formula I:



I.

where R_1–R_4 have the meanings suscribed to them previously and at least one of R_1–R_4 has the formula:

$$-R_6-CH=CH_2 \qquad \text{III.}$$

where R_6 is alkyl, aryl, aralkyl, or alkaryl having from 1 to about 30 carbon atoms. While formula III discloses a terminal ethylenic unsaturation, those skilled in the art will easily recognize that compounds having internal ethylenic unsaturations may also be suitable for the practice of one or more embodiments of the present invention. This family will be recognized to include vinyl, allyl, and other ethylenically unsaturated silanes. It should be appreciated that others of groups R_1–R_3 may also include one or more of such reactive ethylenic unsaturations.

Exemplary members of this family of polymerizable silanes which is useful for the practice of the invention include, for example, allyldimethylsilane, allyltriethoxysilane, allyltrimethylsilane, diphenylvinylethoxysilane, divinyldiethoxysilane, phenylmethylvinylsilane, tetraallyloxysilane, tetravinylsilane, trimethylsilylacetylene, 1-(trimethylsilyl)propyne, trivinylethoxysilane, trivinylmethylsilane, vinyldimethylethoxysilane, vinylmethyldiacetoxysilane, vinylmethyl-diethoxysilane, vinyloxytrimethylsilane, vinyltriacetoxysilane, vinyltriethoxysilane, vinyltriisopropoxysilane, vinyltrimethoxysilane, vinyltrimethylsilane, vinyltriphenoxysilane, vinyltris(2-methoxyethoxy)silane, and related species.

Those skilled in the art will recognize that the above descriptions of silaneous materials suitable for use in the practice of one or more embodiments of this invention is, of necessity, limited. Those skilled in the art will understand that numerous ethylenically unsaturated silane compounds exist which are photochemically polymerizable. Such persons will easily be able to ascertain which of such compounds are suitable for inclusion in one or more embodiments of the invention. Accordingly, all such compounds may, prima facie, be used therein. Furthermore, mixtures of two or more of such silane compounds may be so employed.

Since most silane compositions available commercially have been treated with one or more inhibitors to suppress autopolymerization during storage, and since such inhibitors have been found to retard or prevent rapid photopolymerization, it may be necessary to remove most or all of such inhibitors from silane species for use in the practice of this invention.

The polymerizable resins useful for the formulation of the polymerizable adhesives of this invention preferably comprise at least 20% by weight of at least one of the silanes which have been described hereinabove. Alternatively, it is possible for such resins to comprise up to 100% of such silanes as well. Accordingly, amounts of silane varying from about 20% to about 100% by weight are preferred. More preferred are resins employing from about 40% to about 95% by weight of such silanes. Even more preferred are resins having from about 60% to about 90% of such silanes.

It has been found to be especially preferred to employ amounts of silane in the adhesives of this invention which are greater than about 50% by weight. Such adhesives exhibit particularly good physical properties at elevated temperatures. It is even more preferred to employ from about 60% to about 90% of such silanes for high temperature fixturing and other uses.

The polymerizable resins used to formulate the polymerizable adhesives of this invention may, in addition to the silane species, also contain up to about 80% of a poymerizable, ethylenically unsaturated material which does not contain silicon. Thus, from 0% to about 80%, and preferably from about 5% to about 60% of such ethylenically unsaturated, polymerizable materials may be added. It is even more preferred to employ from about 10% to about 40% of such compounds. Preferred reactive, ethylenically unsaturated materials for the practice of this invention include the acrylic, methacrylic, ethacrylic, etc. esters of various alcohols and other hydroxyl containing polymers and prepolymers. Also useful, are vinyl, allyl, styryl, "enyl", "dienyl", acetylenyl, and numerous other reactive, ethylenically unsaturated species. Preferred for use for the practice of the invention are the acrylic and lower alkyl acrylic acid esters, such as the acrylates and methacrylates. Exemplary species of this class include the acrylic, methacrylic, etc. esters of materials having from 1 to about 40 and preferably from 1 to about 30 carbon atoms. Such materials may be substituted with, inter alia, hydroxyl, amino, thiol, halogen, and other functionalities. Especially preferred examples include the esters of methyl-, ethyl-, isopropyl-, perfluorooctyl-, hydroxyethyl-, 4-hydroxyphenyl-, aminoethyl-, aminophenyl-, thiophenyl-, and numerous other alcohols. Preferred among these are the acrylic, methacrylic, etc. esters of bisphenol-A and its epoxy resins, prepolymers and related materials. The acrylic esters of 2,2-bis(4-hydroxy-2,3,5,6tetrafluorophenyl)propane are also preferred. Those skilled in the art will recognize that numerous other species are also suitable. Polymerizable, ethylenically unsaturated materials having two