

tion. The reaction was monitored by the evolution of HCl gas. After evolution of HCl gas stopped the reaction was continued at 90° C. for one hour. The crude product was dissolved in 250 ml ether and neutralized with 8% by weight of aqueous sodium bicarbonate solution (4×250 ml), washed thoroughly with water (4×250 ml), dried over MgSO₄ and then stripped at 2 mm Hg for two hours to give 87.5 g polyphotoinitiator siloxane.

COMPOSITIONS

The photoinitiators of the invention are compatible with other silicones. They may be compounded with silicones containing photocurable groups such as acrylate, methacrylate, vinyl, silicon hydride, alkylthiol, styryl, acrylamido, methacrylamide, maleate and itaconate. As in Examples VI-VIII, the polymerizable functionality may be synthesized as part of the same siloxane chain which includes the benzoin ether functionality. In either case, the resulting composition would be curable on exposure to UV radiation. Such compositions are useful in coatings, sealants, pottings and adhesives, exhibiting the typical silicone properties: low temperature flexibility, good electrical properties, good weather resistance and excellent thermal stability.

EXAMPLE XII

The compositions listed in Table I were prepared to test the initiating capability of the polyorganosiloxane polyphotoinitiator of Example VI.

TABLE I

	Silicone #1	Silicone #2	Example-VI Polyphoto-initiator	Curing Time
(1)	4.5 g		2 g	40 sec.
(2)	4.5 g		4 g	30 sec.
(3)		3 g	2 g	30 sec.
(4)			alone	30 sec.

Silicone #1 is a polydimethylsiloxane, 600 cts viscos-

Other compositions especially useful as adhesives may be formulated as a mixture of polysiloxane photoinitiator, ethylenically unsaturated monomers and inhibitors. Optional ingredients include multifunctional ethylenically unsaturated monomers; fillers such as fumed silica, glass fibers, synthetic fibers and aluminium oxides; pigments; adhesion promoters such as silane coupling agents; and other additives used in conventional adhesive or coating materials.

The ethylenically unsaturated monomers are those readily polymerized by radical chain mechanisms. Examples are acrylates, methacrylates, maleates or itaconates of monohydric or polyhydric alcohols, such as lauryl alcohol, neopentyl alcohol, triethylene glycol, tripentaerythritol and pentaerythritol; epoxy acrylates; vinyl ketones; styrenes; acrylamide or methacrylamide and their n-substituted derivatives. Mixtures of these monomers can also be formulated with the photoinitiators of the present invention. Any free radical polymerizable monomer may be used provided that it is compatible with the specific polyorganosiloxane photoinitiator with which it is compounded.

The concentration of the polyorganosiloxane photoinitiator in the compositions of this invention can range between about 1% and about 70%, preferably between 5% and 40%. The optimum concentration depends on the desired physical properties of the cured resins. In general, higher concentrations of photoinitiators give softer cured resins.

Common free radical polymerization inhibitors such as hydroquinone, benzoquinone or hindered phenols may be used in the adhesive compositions, typically at levels below 1000 ppm. Other free radical inhibitors may be used without departing the scope of this invention.

EXAMPLE XIV

The compositions listed in Table II were prepared, coated on glass slides and cured by UV light as in example XII.

TABLE II

	Cyclohexyl Methacrylate	Tetrahydro-furfuryl Methacrylate	Example-VI Hexanediol Dimethacrylate	Isobornyl Acrylate	Example VI Polyphoto-Initiator	Cure Time
(1)	0.3 g	—	—	—	1 g	1 min
(2)	0.1 g	—	—	—	1 g	1 min
(3)	—	0.2 g	—	—	1 g	1 min
(4)	1 g	—	0.5 g	—	1 g	1 min
(5)	1 g	—	1 g	—	1 g	1 min
(6)	—	—	—	1 g	1 g	30 sec
(7)	—	—	—	2 g	1 g	1 min

ity, and terminated with methacryloxypropyldimethylsilyl groups. Silicone #2 is an approximately 100,000 high molecular weight polydimethylsiloxane gum containing 18% by repeat unit vinyl functional group and is terminated with trimethylsilyl groups. Each composition was coated on a glass slide to form a 20-30 mil film and exposed to UV at 70,000 uw/cm² for the specified time. Each composition cured to a flexible film which was very transparent and did not become cloudy over time.

EXAMPLE XIII

A thin film of the product of example IX was spread on a glass slide and irradiated for 1 minute per side with UV light as in example XII. The material cured to a rubbery solid film.

The resulting cured films varied from translucent to opaque. All were tough flexible films which exhibited stress-whitening phenomena when stretched, indicating that graft copolymers had formed. The cured film from composition 7 remained flexible even at -40° C.

The compositions of this invention may be exposed to actinic light from any source and of any type as long as it supplies sufficient amount of ultraviolet light of between 200 nm and 400 nm. The most common source is medium-pressure mercury arc. The curing time depends on the specific ingredients in the composition, the amount of the photoinitiators and the intensity of the UV light.

From the foregoing it can be seen that in addition to the specific examples, many further variations within the skill of those practicing in the art may be employed