

A formulation designated DS/1.6 (corresponding to the same t-BAEMA.HF level as used in the 10% loading with FR-16 described below) was prepared as follows:

		W/W %
DS Universal	0.1968 g.	49.2%
DS Catalyst	0.1968 g.	49.2%
t-BAEMA.HF	0.0064 g.	1.6%

A second formulation was prepared designated DS/3.0. This corresponds to t-BAEMA.HF level used with the 10% loading of FR-30 described below. DS/3.0 utilized the following materials:

		W/W %
DS Universal	0.1940 g.	48.5%
DS Catalyst	0.1940 g.	48.5%
t-BAEMA.HF	0.012 g.	3.0%

A third formulation was also prepared without incorporating t-BAEMA.HF as follows:

		W/W %
DS Universal	0.075 g.	50.0%
DS Catalyst	0.075 g.	50.0%

The various formulations noted immediately above were mixed and cured at room temperature within about 1-2 minutes after being poured into a 1 by 10 millimeter mold.

The various formulations were then prepared in which the DS Sealant was loaded with pulverised FR-16 resin, FR-30 resin or polymerized DS sealant.

A mixture was formed of 0.7 g of DS Universal with 0.1556 g. of 64-88 micron powdered resins FR-16, FR-30 or polymerized DS Sealant.

Each of the mixtures was placed in a vacuum overnight. Afterwards, 0.1222 g. of this mixture was combined with 0.100 g. of DS Catalyst and mixed for 20 seconds after which each of the mixtures was poured into a 1 by 10 millimeter mold, covered and cured in about 1-2 minutes.

By utilizing the foregoing procedures, 1 by 10 millimeter pellets of the following compositions are obtained.

1. DS sealant made with DS Universal and DS Catalyst only.
2. DS sealant made with 1.6% t-BAEMA.HF corresponding to a 10% loading with FR-16.
3. DS sealant containing 3% t-BAEMA.HF corresponding to a 10% loading with FR-30.
4. DS sealant containing 10% by weight of 64-88 micron DS sealant powder.
5. DS sealant containing 10% by weight 64-88 micron FR-16 powder.
6. DS sealant containing 10% by weight 64-88 micron FR-30 powder.
7. FR-16 self cured.
8. FR-30 self cured.

Each of the above pellets was placed in a 100% relative humidity environment at 37° C. overnight and weight and hardness of each determined. The pellets were then placed in 10 milliliters of 0.2M sodium chloride and the pellets in solution were then positioned in a shaker bath that was kept at 37° C. Fluoride ion read-

ings were made and the sodium chloride solution changed at intervals of 15 minutes, ½ hour, 45 minutes, 1 hour, 1½ hours, 2 hours, 4 hours, 24 hours, 48 hours, 5 days, 1, 2, 3, 4, 6, 8, 12 and 16 week intervals. The hardness was checked at 24 hours, 1 week, 2 week, 1 month, 2 month, 3 month and 4 month intervals.

The results obtained are set forth in the attached FIGS. 1-4.

An additional acrylic controlled, fluoride-releasing interpolymer was prepared from bis-EMA, bis-MA and TEGDMA. Formulations were prepared for both interpolymers which are to incorporate fillers and interpolymers which may be used without filler materials. The filler is added from about 5 to about 90 percent by weight of the total formulation. The preferred ranges for the formulations, and parts by weight are given below. Benzoyl peroxide is used as the polymerization initiator in an amount from about 0.5 to about 3.0 percent by weight, and an accelerator comprising either N,N- dimethyl-p-toluidine or DHEPT from about 0.5 to about 3.0 percent by weight is employed and the compositions cured at ambient temperatures. The resins harden within about one-half minute to about five minutes. The preferred ranges for the various components are set forth below.

COMPONENT	PREFERRED RANGE FOR	
	UNFILLED RESINS	FILLED RESINS
Fluoride monomer*	2-10	2-10
Bis-EMA**	30-45	40-75
Bis-MA	0-5	4-9
TEGDMA***	68-38	54-4
MAA	0-2	0-2

\*t-BAEMA-HF, DMAEMA-HF, DEAEMA-HF(N,N-diethylamino ethyl methacrylate) or quaternary fluoride salts of DMAEMA and DEAEMA.

\*\*Bis-GMA may be substituted for all or a portion of Bis-EMA.

\*\*\*triethyleneglycol dimethacrylate

It has been found that by using bis-EMA rather than bis-GMA, a reduction of the overall cured-resin hydrophilicity is obtained. This helps to offset the hydrophilic nature of the fluoride monomers. Degradation in physical properties is reduced with this substitution, due to the lower degree of moisture imbibition uptake. Craze and discoloration are minimized as well.

In the foregoing experiments, it has also been discovered that by employing dimethylaminoethyl methacrylate hydrogen fluoride (DMAEMA-HF) as the acrylic fluoride monomer, the interpolymer formed therefrom according to the invention has lower initial color than interpolymers prepared from t-BAEMA.HF.

In summation, the present invention provides a new resin and composition, as well as a method for treating teeth which forms a protective barrier for the surface of the tooth and supplies a source of fluoride ions for controlled release.

Thus, while there have been described what are presently believed to be the preferred embodiments of the invention, those skilled in the art will realize that changes and modifications may be made thereto without departing from the spirit of the invention and it is intended to claim all such changes and modifications as fall within the true scope of the invention.

What is claimed is:

1. An acrylic, controlled-fluoride-releasing interpolymer comprising the reaction product of: