



(12) **United States Patent**
Antonucci et al.

(10) **Patent No.:** US 6,177,534 B1
(45) **Date of Patent:** Jan. 23, 2001

(54) **SILYLATED RESINS AND THE SYNTHESIS THEREOF**

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(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/213,892**

(22) Filed: **Dec. 17, 1998**

Related U.S. Application Data

(60) Provisional application No. 60/068,535, filed on Dec. 23, 1997.

(51) **Int. Cl.**⁷ **C08G 77/14**

(52) **U.S. Cl.** **528/26; 528/28; 528/29;**
556/418; 523/116; 260/998.11

(58) **Field of Search** 528/26, 28, 29;
556/418; 523/116; 260/998.11

(56) **References Cited**

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(List continued on next page.)

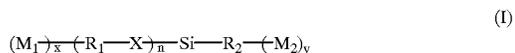
* cited by examiner

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(57) **ABSTRACT**

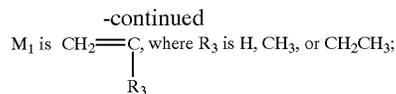
A silylated resin suitable for use as an adhesive binder for composites and in sealant and adhesive dental applications is represented by the general formula (I):



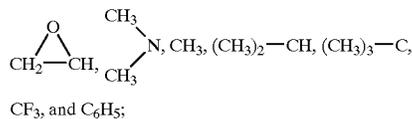
in which:

R₁ is an aliphatic, cycloaliphatic, aryl, hydrocarbon, or fluorocarbon group;

R₂ is the same as R₁ or a different aliphatic, cycloaliphatic, aryl, hydrocarbon, or fluorocarbon group;



M₂ is the same as M₁ or a different functional or nonfunctional group selected from the group consisting of:

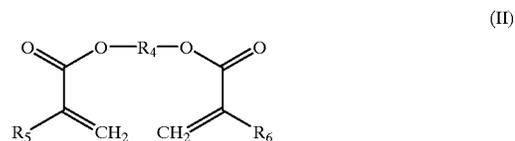


n is 1-3;

x is 1-20; and

y is 1-20;

which comprises the reaction product of the exchange reaction of a hydroxylated, aminated, or carboxylated acrylic resin represented by the general formula (II):



in which:

R₄ is an aliphatic, cycloaliphatic, aryl, hydrocarbon, or fluorocarbon group with one or more protic functional groups selected from the group consisting of:

OH, N—H, and CO₂H

R₅ is H or CH₃; and

R₆ is H or CH₃;

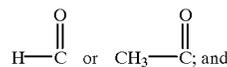
with a trialkoxyorganosilane or triacyloxyorganosilane represented by the general formula (III):



in which:

R₇, R₈, and R₉ each is:

CH₃, CH₃CH₂, CH₃CH₂CH₂, (CH₃)₂—CH,



R₁₀ is an aliphatic, or aryl group which can optionally be substituted with a group from the group of an acrylic group, a methacrylic group, an epoxy group, and a substituted amino, hydroxyl, or carboxylic acid group such as an ester or an amide.