Still another approach of making vegetable oil-based PSAs is disclosed in US patent Nos. 9,315,704 and 9,556,368. In this approach, epoxidized vegetable oils (EVO) and dicarboxylic acids/polycarboxylic acids are first polymerized via the reaction of the epoxy group of EVO and -COOH of the dicarboxylic acids/polycarboxylic acids to give prepolymers. The prepolymers are then further thermally cured to give PSAs via the same reaction between the epoxy and –COOH groups, which requires a typical cure time of from minutes to hours depending on curing temperature. The long curing time could be a bottleneck in the manufacture of the PSAs.

SUMMARY

In an aspect of the present disclosure, there is provided a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disposed on the backing substrate, wherein the pressure sensitive adhesive composition includes an ultraviolet radiation-cured polymer made from:

(a) at least one epoxidized plant oil, at least one epoxidized animal fat, or a mixture thereof;

(b) at least one dicarboxylic acid, at least one polycarboxylic acid, or a mixture thereof; and

(c) at least one compound that contains both one carbon-carbon double bond (C=C) and at least one carboxylic acid group.

In another aspect of the present disclosure, there is provided a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disposed on the backing substrate, wherein the pressure sensitive adhesive composition includes an ultraviolet radiation-cured semi-interpenetrating polymer network made from a blend of:

(a) at least one compound containing at least two acrylate or methacrylate groups;

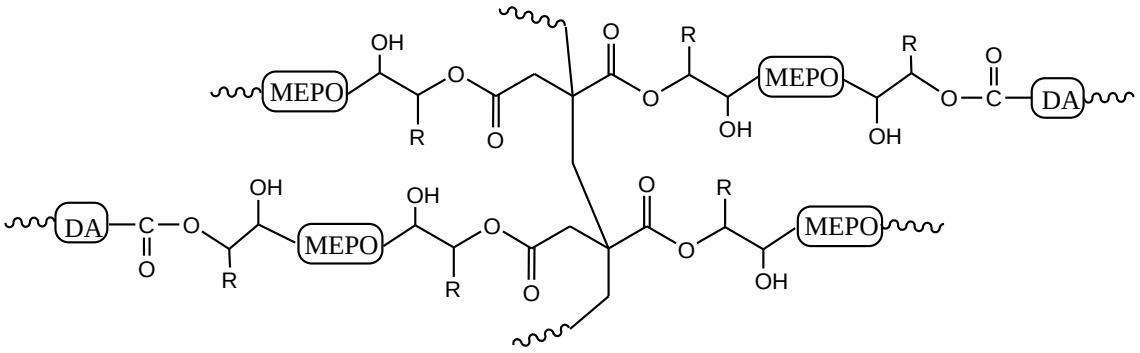
(b) a photoinitiator; and

(c) a polyester prepared from polymerization of at least one monocarboxylic acid modified-epoxidized plant oil with at least one dicarboxylic acid or polycarboxylic acid.

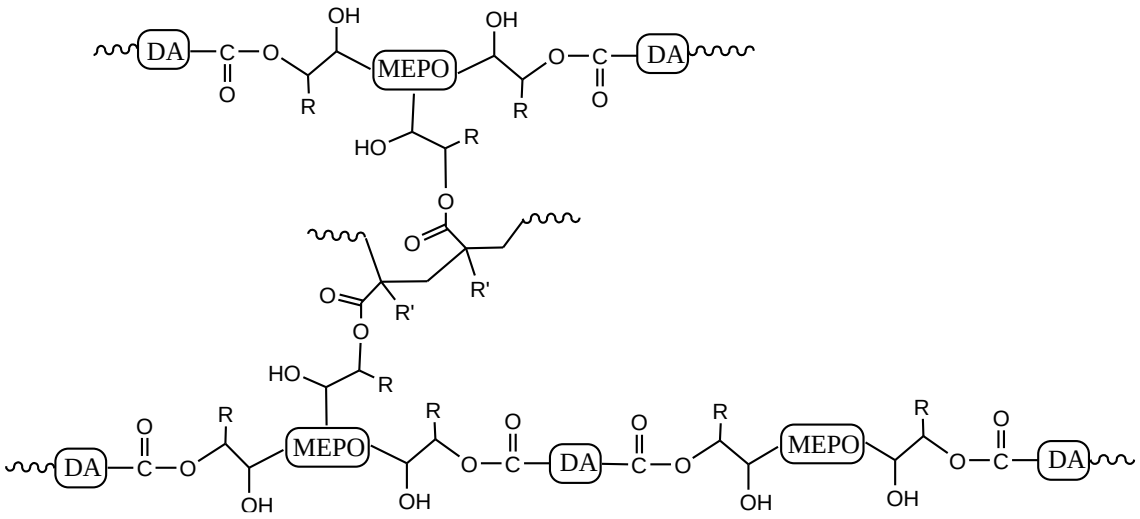
In a further aspect of the present disclosure, there is provided a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disposed on the backing substrate, wherein the pressure sensitive adhesive composition includes an ultraviolet radiation-cured polymer having a structure of:



or



wherein MEPO denotes structure derived from an epoxidized plant oil or modified epoxidized plant oil; DA denotes structure derived from a dicarboxylic acid or polycarboxylic acid; each R' is independently H or methyl group; each R is independently an alkyl derived from a part of fatty acid chains from the epoxidized plant oil or the modified epoxidized plant oil; and each ~~~ represents independently a segment of a polyester chain.

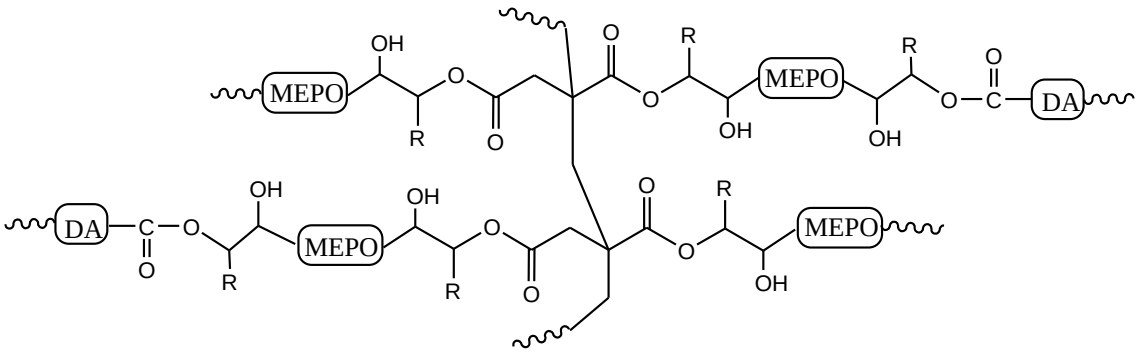
In another aspect of the present disclosure, there is provided a pressure sensitive adhesive composition comprising an ultraviolet radiation-cured polymer made from:

(a) at least one epoxidized plant oil, at least one epoxidized animal fat, or a mixture thereof;

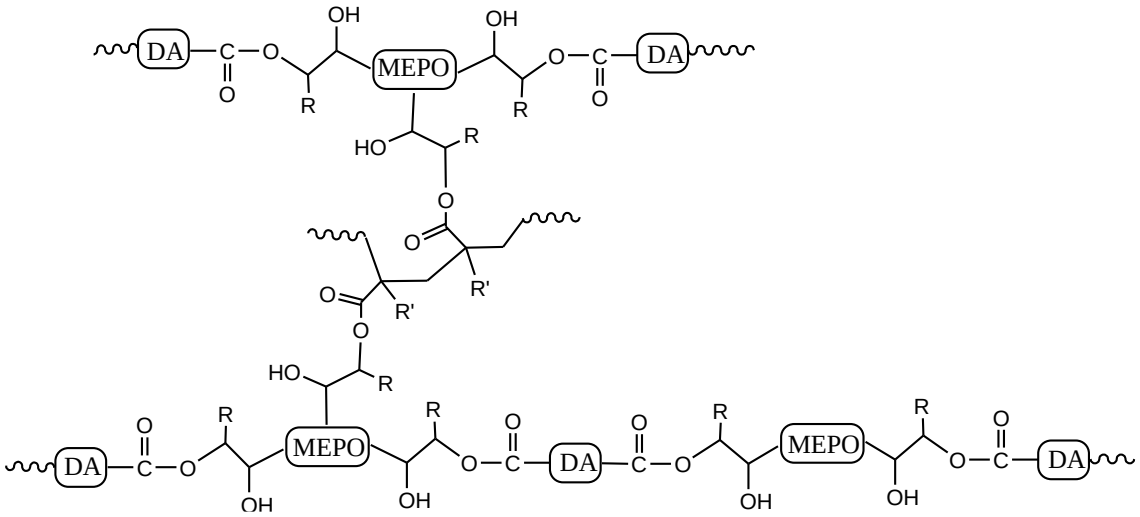
(b) at least one dicarboxylic acid, at least one polycarboxylic acid, or a mixture thereof; and

(c) at least one compound that contains both one carbon-carbon double bond (C=C) and at least one carboxylic acid group.

In a further aspect of the present disclosure, there is provided a pressure sensitive adhesive composition comprising a polymer having a structure of:



or



wherein MEPO denotes structure derived from an epoxidized plant oil or modified epoxidized plant oil; DA denotes structure derived from a dicarboxylic acid or polycarboxylic acid; each R' is independently H or methyl group; each R is independently an alkyl derived from a part of fatty acid chains from the epoxidized plant oil or the modified epoxidized plant oil; and each ~~~ represents independently a segment of a polyester chain.

In another aspect of the present disclosure, there is provided an ultraviolet radation-curable composition comprising:

(a) at least one epoxidized plant oil, at least one epoxidized animal fat, or a mixture thereof;

(b) at least one dicarboxylic acid, at least one polycarboxylic acid, or a mixture thereof;

(c) at least one compound that contains both one carbon-carbon double bond (C=C) and at least one carboxylic acid group; and

(d) at least one photoinitiator.

In a further aspect of the present disclosure, there is provided a method comprising:

polymerizing (a) at least one epoxidized plant oil, at least one epoxidized animal fat, or a mixture thereof, (b) at least one dicarboxylic acid, at least one polycarboxylic acid, or a mixture thereof, and (c) at least one compound that contains both one carbon-carbon double bond (C=C) and at least one carboxylic acid group;

adding at least one photoinitiator; and

subjecting the resulting resin to ultraviolet radiation to form a crosslinked polymer.

In another aspect of the present disclosure, there is provided a method for making a crosslinked polyester comprising:

step-growth polymerizing (a) at least one epoxidized plant oil, at least one epoxidized animal fat, or a mixture thereof, (b) at least one dicarboxylic acid, at least one polycarboxylic acid, or a mixture thereof, and (c) at least one compound that contains both one carbon-carbon double bond (C=C) and at least one carboxylic acid group to form a polyester that includes pendant C=C bonds; adding at least one photoinitiator; and subjecting the resulting resin to ultraviolet radiation to form a crosslinked polyester.

In a further aspect of the present disclosure, there is provided a pressure sensitive adhesive composition comprising the crosslinked polymer made by any one of the methods disclosed herein.

In another aspect of the present disclosure, there is provided a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disclosed herein, disposed on the backing substrate.

Disclosed herein is a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disposed on the backing substrate, wherein the pressure sensitive adhesive composition includes an ultraviolet radiation-cured polymer made from:

(a) at least one epoxidized plant oil, at least one epoxidized animal fat, or a mixture thereof;

(b) at least one dicarboxylic acid, at least one polycarboxylic acid, or a mixture thereof; and

(c) at least one compound that contains both one carbon-carbon double bond (C=C) and at least one carboxylic acid group.

Also disclosed herein is a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disposed on the backing substrate, wherein the pressure sensitive adhesive composition includes an ultraviolet radiation-cured semi-interpenetrating polymer network made from a blend of:

(a) at least one compound containing at least two acrylate or methacrylate groups;

(b) a photoinitiator; and

(c) a polyester prepared from polymerization of at least one monocarboxylic acid modified-epoxidized plant oil with at least one dicarboxylic acid or polycarboxylic acid.

Further disclosed herein is a pressure sensitive adhesive construct comprising:

(A) a backing substrate; and

(B) a pressure sensitive adhesive composition disposed on the backing substrate, wherein the pressure sensitive adhesive composition includes an ultraviolet radiation-cured polymer having a structure of: