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MATERIALS FOR FINISHING TEXTILES AND PROCESSES FOR PRODUCING AND USING THE SAME

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The present invention relates to materials and processes for imparting improved properties to textile materials, and to textile materials treated therewith. More particularly, the present invention relates to novel resinous condensation products capable of imparting the properties of durable water repellency, shrink resistance and crease resistance to textile materials treated therewith.

In the finishing of textile materials, such as rayon fabrics and of fabrics containing rayon blends which are to be utilized, for example, in the manufacture of rainwear and the like, it is desirable that water repellent properties be imparted thereto. For obvious reasons, the water repellency imparted to such fabrics should be very high initially in order to render the fabrics suitable for the purposes for which they are to be used. Also, it is desirable that the water repellency of such fabrics be durable; that is, that the treated fabrics retain their water repellent characteristics after being subjected to the ordinary laundering and dry cleaning operations normally employed in the cleansing of such fabrics. In addition, any treatment of textile materials to render the same water repellent should be such that the hand or feel of the treated fabric is not objectionably altered thereby; that is, there should be no excessive weighting of the fabric nor should the fabric take on any harshness of feel.

It is also often common practice to treat the same fabrics with one or more agents to render the fabric stable against shrinkage and resistant toward creasing and, very often, to impart a wool-like hand or feel to the fabric.

Where all of the above properties are desired in the finished fabric, it would naturally be advantageous to be able to combine the above treatment in such manner that only one operation is required. To accomplish this, the material utilized for imparting water repellency to textile materials should be compatible in the same treating bath with the materials normally used to impart shrink resistance and crease resistance to textile materials and thus capable of being applied to the fabric in the same treating operation. Furthermore, the water repellent material employed in such operation should be of such character as not to impair the curing characteristics of the materials employed for the stabilization of the fabric nor to impair the efficiency of the said treatment, nor should it in any way impair the hand of the treated goods which would normally be obtained as a result of the stabilization treatment alone.

In accordance with the present invention, and as one aspect thereof, there are provided materials capable of imparting a high degree of water repellency to fabrics treated therewith, and which display all of the properties and characteristics desired of such materials as outlined above. Further, the water repellency imparted to textile materials by the use of the water repellent materials of the present invention is highly durable, being substantially unaffected after having been subjected to several cleaning or laundering operations.

As another aspect of the present invention there are provided materials which, in addition to imparting durable water repellent properties to textile materials treated therewith, also impart a high degree of crease resistance and dimensional stability to the said textile materials.

The materials provided in accordance with the present invention and which are suitable for finishing textile materials to impart the above described properties to said textile materials are heat-convertible resinous condensation products, stable at normal room temperatures, obtained by reacting a nitrogenous compound of the group consisting of urea, thiourea, mono-alkylated urea, mono-alkylated thioureas, guanyl urea, biuret, dicyandiamide and guanidine with a material, such as paraformaldehyde, which furnishes formaldehyde under the reaction conditions and with a lower aliphatic alcohol preliminarily under alkaline conditions and then under acid conditions to form a resinous partial condensation product of the said materials, and thereafter reacting the said partial condensation product under acid conditions with a hydrophobic material of the group consisting of higher amides, higher amines, and higher alcohols to obtain a heat-convertible resinous condensation product, capable of polymerization or of further condensation under heating conditions to an insoluble state.

To obtain heat-convertible resinous condensation products with the materials above set forth, having the properties and characteristics of those of the present invention, that is, products which may be employed in the finishing of textile materials and which are capable, upon suitable further treatment, of polymerizing or reacting further upon the treated fabric to impart highly water repellent characteristics and/or crease resistant and shrink resistant qualities thereto, it is essential that the materials utilized in the preparation of the said condensation products be employed in definite relative proportions or within definite ranges of proportions with respect to one another. For example, urea, formaldehyde and lower aliphatic alcohols have heretofore been reacted together under such conditions that a bis-alkoxymethyl urea is formed; the product formed representing the reaction of one mol of urea, two mols of farmaldehyde and two mols of a lower aliphatic alcohol. However, these compounds are so highly reactive that when it is attempted to condense the said compounds with a hydrophobic material, as previously mentioned, under the conditions required to secure the formation of a resinous condensation product, the reaction proceeds so rapidly that it is impossible to obtain a satisfactory resinous condensation product capable of use in the finishing of textile materials. Upon such reaction, there is obtained instead a hard, insoluble resinous material.

The reaction of urea, formaldehyde and a lower aliphatic alcohol to form an N,N'bis-(alkoxymethyl) uron, corresponding to the reaction of one mol urea, 4 mols of formaldehyde and 2 mols of a lower aliphatic alcohol has also been described. This compound is a very stable liquid material which is unusually resistant to the normal catalytic action of acids upon urea-formaldehyde condensates and toward heating, and therefore has no tendency to form polymerization products. Therefore, when it is attempted to react this material with the hydrophobic compounds employed in the preparation of the resinous condenastion products of the present invention, a product is obtained which is incapable of further condensation to form an insoluble resinous material.

It has been found in accordance with the present invention that if the materials employed to provide the condensation products described herein are employed in the ratios of 1 mol of the nitrogenous compound, 2.5–3.5 mols of paraformaldehyde or other suitable formaldehyde providing compound, and 3.0–4.0 mols of a lower aliphatic alcohol and reacted under the conditions hereinafter set forth to form a partial condensation product thereof, and the product thus obtained is then reacted with from 0.1–2.6 mols of a hydrophobic compound of the type previously described under acid conditions of reaction, a heat-convertible resinous condensation product is obtained which is capable of utilization in the treatment of textile materials to impart durable water-repellent characteristics and/or crease-resistant and shrink-resistant properties thereto. It is, of couse, understood that were the above reaction carried to full completion, polymerization of the reaction product would take place and a hard insoluble resinous material would eventually result as the end product. Therefore, the first reaction involving the nitrogenous compound, formaldehyde and a lower aliphatic alcohol is carried out till about 90 percent of the formaldehyde has reacted with the other constituents,

and the subsequent reaction of the condensation product so obtained with the hydrophobic compound is only carried out till substantially all of the said hydrophobic compound has reacted with the said partial condensation product. The end product thus obtained is a stable heat-convertible resinous product which is soluble in the common organic solvents such as, for example, the alcohols such as ethyl alcohol and butyl alcohol, the common ester solvents such as ethyl acetate and isopropyl acetate, benzene, varsol and carbon tetrachloride, and which is also soluble or easily dispersible in water.

Those compounds prepared according to the present invention wherein the hydrophobic compound is utilized in an amount of from 0.5–2.6 mols per mol of the initial nitrogenous compound employed in the preparation of the resinous partial condensation product formed by the reaction of the nitrogenous compound, formaldehyde and the lower aliphatic alcohol is characterized by its ability to impart a high degree of water-repellency to textile materials which is also extremely durable. Those compounds prepared in accordance with the present invention wherein the hydrophobic compound is employed in the mol ratio of 0.1–0.5 mols per mol of the nitrogenous compound employed in the preparation of the said partial condensation product as described above are likewise water-repellent but are also characterized by their ability to impart a high degree of durable crease-resistance and shrink-resistance to fabrics treated therewith. The latter compounds therefore have definite advantages over those resinous materials in common use in the industry to impart shrink-resistant and crease-resistant characteristics to textile materials but which display little or no water-repellent properties.

As stated hereinbefore, the nitrogenous compounds which may be utilized in the reactions herein set forth whereby the resinous condensation products of the present invention are prepared, include urea, thiourea, the mono-alkylated ureas, the mono-alkylated thioureas, guanyl urea, biuret, dicyandiamide and guanidine. The mono-alkylated ureas and thioureas are preferably those containing lower alkyl radicals as, for example, N methyl urea, N ethyl urea, N methyl thiourea and N ethyl thiourea. The di-substituted ureas, that is, both the N,N′ and the N,N di-substituted ureas have not been found to be operative in the preparation of the desired products.

The material utilized to liberate formaldehyde in the reactions described in the present invention should be one wherein the formaldehyde provided is in a substantially anhydrous condition. Thus any of the polymeric forms of formaldehyde may be employed, such as trioxane or paraformaldehyde. Gaseous formaldehyde may also be employed, it merely being required that the materials employed be used in such amounts as to provide the mol ratio of formaldehyde required.

Any of the lower aliphatic alcohols may be employed in the preparation of the condensation products of the present invention. Thus methyl alcohol, ethyl alcohol, propyl alcohol, isopropyl alcohol or butyl alcohol may all be utilized with the materials described in the preparation of the said condensation products.

The so-called hydrophobic compounds which are reacted with the partial condensation products to provide the heat-convertible condensation products of the present invention are, as has been stated hereinbefore, the higher amides, the higher amines, and the higher alcohols. By the term "higher" as used in connection with these materials is meant an amide, or an amine, or an alcohol containing a hydrocarbon radical of at least 12 carbon atoms. In the practice of the present invention, those compounds which apparently provide the best results and which are preferred in preparing the products of the present invention are those which contain at least 16 carbon atoms in the hydrocarbon radical. However, those compounds having at least 12 carbon atoms in the hydrocarbon radical have been found to provide satisfactory results when employed in accordance with the present invention. As specific examples of such compounds there may be mentioned lauramide, myristic acid amide, palmitic acid amide, stearamide, behenic acid amide, montanic acid amide, and in general amides of fatty acids as obtained from naturally occurring fats; laurylamine, hexadecylamine, octadecylamine; and, for example, lauryl alcohol, myristyl alcohol, cetyl alcohol and stearyl alcohol. There may also be employed the amides, amines and alcohols of the higher hydrocarbon materials obtained from the OXO Process and the Fischer-Tropsch Synthesis, as well as amides, amines and alcohols of synthetic hydrocarbons of at least 12 carbon atoms wherein the hydrocarbon radical consists of an alkyl-aryl chain. Amides, amines and alcohols of rosin or rosin derivatives may also be utilized in preparing the products of the present invention.

In carrying out the present invention, a lower aliphatic alcohol and, for example, paraformaldehyde are charged to a vessel equipped for refluxing the charged materials, together with a sufficient amount of an alkaline material, such as an alkali metal hydroxide, to render the mixture alkaline; a pH of 8 to 9 being completely satisfactory for the purposes of the present invention. The mixture is then heated until the paraformaldehyde has dissolved, a temperature not in excess of 100° C. usually being sufficient for this purpose. A nitrogenous compound of the class previously described is then added to the solution and heating is continued at a temperature of approximately 70°–85° C. for approximately 15–20 minutes after the said nitrogenous compound has gone into solution. The pH of the reaction mixture is then reduced to a point within the range of approximately 2.5 to 5.0 and heating is continued at a temperature of 75°–100° C. for approximately 15–20 minutes. At this point a hydrophobic compound, as previously described, is slowly added to the reaction mixture and when addition of the same is completed and the said compound has completely dissolved, the reaction mixture is heated for approximately one hour at a temperature of approximately 80°–100° C., or until substantially complete reaction of the hydrophobic compound with the remaining components of the reaction mixture has been secured. The product thus obtained is a heat-convertible resinous condensation product stable at normal room temperatures and capable of utilization in the finishing of textile materials to impart water-repellent characteristics and/or crease-resistant and shrink-resistant properties thereto.

The products obtained as above described, if not already water-soluble or self-emulsifiable, may be emulsified with water by the addition of small quantities of emulsifying agents, thus providing a convenient means for application of the products to textile materials.

In such treatment of textile materials, a treating bath is prepared which satisfactorily may contain from approximately 2%–15% by weight of a resinous condensation product prepared in accordance with the present invention. To such bath there is usually added a latent polymerization catalyst such as ammonium chloride or other suitable acid catalyst such as ammonium sulfate or diammonium phosphate. The textile material to be treated is then immersed in the treating bath as by normal padding operations, the amount of "wet pick-up" by the fabric being regulated by passing the fabric through squeeze rolls. The impregnated fabric is then dried and cured at temperatures of the order of approximately 100°–180° C.; for example, heating at 155° C. for approximately 5 minutes having been found satisfactory. Depending upon the particular condensation product employed, the fabric thus treated has excellent water-repellent and/or crease-resistant and shrink-resistant characteristics which are retained even upon subsequent laundering and dry cleaning operations.

Depending upon the products of the present invention which are utilized and depending upon the qualities desired in the finished product, there may also be used, together with the products of the present invention, those resins which are in common use in the textile industry for finishing textile materials such as, for example, the methylolurea condensates, or the partially polymerized urea-formaldehyde, melamine-formaldehyde and phenol-formaldehyde condensates. Thus, enhanced characteristics of water-repellency, shrink-resistance and crease resistance may be imparted to textile materials in one operation by means of a single bath treatment.

The following Examples 1 to 10 demonstrate that aspect of the present invention involving the production of resinous condensation products which are capable of imparting a high degree of water repellency to fabrics treated therewith. All amounts given therein are set forth in parts by weight.

Example 1

96 parts of methanol, 84 parts of paraformaldehyde and 0.1 part of caustic soda are charged to a vessel equipped with stirrer, thermometer and reflux condenser. The mixture is heated to reflux conditions and held at such temperature until the paraformaldehyde has dissolved. 60 parts of urea are added thereto and heating is continued at a temperature of 73°–76° C. for approximately 15 minutes. The pH of the reaction mixture is then lowered to approximately 3.0 to 3.5 with phosphoric acid and heating is continued for approximately 15 more minutes at a temperature of 75°–83° C. 290 parts of stearamide are then slowly added to the reaction mixture and after solution of the stearamide therein has been effected, the reaction mixture is heated for approximately one hour at a temperature of 83°–86° C. At the end of this period there is secured as a condensation product a resinous material capable of imparting water-repellent characteristics to textile materials. The entire reaction as carried out above and in the succeeding examples is carried out under agitation conditions.

A concentrated emulsion, suitable for use in a textile treating bath, may be prepared by adding to the reaction product obtained above 10 parts of coconut fatty acid and 30 parts of triethanolamine followed by 427 parts of water at 75° C. The mixture is subjected to agitation without heating and, as the temperature begins to fall, a creamy, light colored emulsion forms. Stirring is continued for approximately 15 minutes at a temperature of approximately 60°–65° C. and the emulsion is allowed to cool to room temperature without stirring. The product thus obtained is readily dispersible in cold or hot water to provide dilute emulsions suitable for application to textile materials.

Example 2

The reaction described in Example 1 is duplicated except that in place of urea there are substituted 74 parts of N-methyl urea. A product similar in its characteristics to that obtained in Example 1 is secured.

Example 3

138 parts of ethyl alcohol, 99 parts of paraformaldehyde and 0.2 part of caustic soda are charged to a suitable reaction vessel as described in Example 1 and the materials are refluxed under agitation conditions until solution of the paraformaldehyde has been obtained. 76 parts of thiourea are added and when solution of the same is secured, the reaction mixture is heated for approximately 15 minutes at 70°–75° C. The pH of the mixture is then lowered to approximately 3.0–3.5 with phosphoric acid and heating is continued for approximately 15 more minutes. A total of 237.3 parts of behenic acid amide are then slowly added to the reaction mixture and when addition of the same has been completed, the mixture is heated for approximately one hour at a temperature of approximately 80°–85° C. The product thus obtained is a resinous condensation product capable of use in accordance with the present invention to impart highly water-repellent characteristics to textile materials.

Example 4

The reaction described in Example 3 is duplicated except that in place of thiourea there are substituted 104 parts of N-ethyl thiourea. A resinous condensation product having highly durable water-repellent properties is secured.

Example 5

96 parts of methanol, 84 parts of formaldehyde and 0.1 part of caustic soda are refluxed until the paraformaldehyde has dissolved. 84 parts of dicyandiamide are added to the mixture and heating is continued at 70°–75° C. for 15 minutes. The reaction mixture is then acidified with phosphoric acid to a pH of approximately 3.0 and heating is continued for 15 more minutes at a temperature of 75°–80° C. 502 parts of lauramide are then slowly added to the reaction mixture and when addition of the lauramide has been completed, the reaction mixture is heated for one hour at a temperature of 80°–85° C. The product thus secured is characterized by its ability to impart highly water-repellent properties to textile materials.

Example 6

112 parts of methanol, 96 parts of paraformaldehyde, and 0.1 part of caustic soda are refluxed as described in Example 1 until solution of the paraformaldehyde is obtained. 60 parts of urea are then added thereto and the admixture heated for approximately 20 minutes at 70°–75° C. The pH of the admixture is lowered to approximately 3.0–3.5 with phosphoric acid and heating is continued for approximately 15 more minutes at a temperature of 75°–80° C. 269 parts of octadecylamine are then slowly added to the reaction mixture which is then heated at 80°–86° C. for about one hour. The reaction product thus obtained has excellent water-repellent properties when applied to textile materials.

Example 7

96 parts of methanol, 75 parts of paraformaldehyde, and 0.1 part of caustic soda are refluxed under the conditions hereinbefore set forth until solution of the paraformaldehyde is secured. 102 parts of guanyl urea are added and the admixture heated for approximately 15 minutes at 75°–80° C. The pH of the admixture is then reduced to approximately 3.0–3.5 with phosphoric acid and heating is continued for 15 more minutes. There are then slowly added 370 parts of laurylamine and heating is continued for one hour at a temperature of 80°–85° C. The product secured at the end of this period is a resinous condensation product having water-repellent properties when applied to textile materials in the manner set forth herein.

Example 8

A mixture of 96 parts of methanol and 84 parts of paraformaldehyde are refluxed until solution of the paraformaldehyde is obtained. 103 parts of biuret are added to the reaction mixture and the pH thereof is adjusted to a pH value of 8 to 9 with caustic soda. The reaction mixture is then refluxed for 15 minutes at a temperature of 70°–75° C., cooled to about 50° C., acidified with phosphoric acid to a pH value of 3–3.5, and refluxed for another 15 minutes. 403.5 parts of octadecylamine are then added to the reaction mixture and when solution of the octadecylamine is completed, the reaction mixture is heated for one hour at 80°–85° C. The product thus obtained has excellent water-repellent properties when applied to textile materials.

Example 9

180 parts of propyl alcohols, 75 parts of paraformaldehyde, and 0.1 part of caustic soda are heated until solution of the paraformaldehyde is obtained. 60 parts of urea are added thereto and when solution of the same has been obtained, the reaction mixture is heated for 15 minutes at 80°–85° C. The pH of the mixture is then lowered to approximately 3.0 to 3.5 with phosphoric acid and heating is continued for approximately another 15 minutes. 270 parts of stearyl alcohol are then slowly added to the reaction mixture and when addition of the same has been completed, the mixture is heated for approximately one hour at 80°–86° C. There is thus obtained a resinous condensation product capable of imparting permanent water-repellent properties to textile materials.

Example 10

A mixture of 138 parts of ethyl alcohol and 90 parts of paraformaldehyde, are refluxed till solution of the paraformaldehyde is secured. 59 parts of guanidine are added to the solution which is then refluxed for about 15 minutes at 75°–80° C. The pH of the reaction mixture is then lowered to approximately 3–3.5 and refluxing thereof is continued for 15 more minutes. 484 parts of cetyl alcohol are then added to the reaction mixture which is then again refluxed for one hour at a temperature of 80°–85° C. The resultant product is a heat convertible resinous condensation product capable of imparting durable water-repellent properties to textile materials.

As a demonstration of the effectiveness of the water-repellency imparted to textile materials by the products of the present invention, textile treating baths were prepared containing the condensation product of Example 1 in varying concentrations by weight as hereinafter set forth in the table that follows, each bath also con-

taining 18% by weight of a methylolurea thermosetting resin used for shrinkproofing textiles, 0.5% by weight of ammonium hydroxide, and 1.0% by weight of ammonium chloride. Samples of a viscose gabardine suiting fabric were passed through the baths and the excess pick-up was removed therefrom by passing the fabrics through squeeze rolls. The treated fabrics were dried and then cured for 5 minutes at 155° C. The following results with respect to the water-repellency of the treated fabrics were obtained.

Concentration of Water-Repellent in Treating Bath, by Weight	Spray Ratings of the Treated Fabric		
	Initial	After 3 Dry Cleanings	After 3 Rayon Washes
4%	85	85	85
6%	100	85	100
8%	100	90	100
10%	100	90	100

The fabric resulting from the above treatment not only displayed the excellent water-repellent properties shown in the above table, but also had excellent resistance towards shrinkage. Also, no objectionable effects upon the hand or feel of the treated fabric were obtained as a result of the treatment outlined above.

The resinous condensation products of the present invention which are capable of imparting a high degree of shrink-resistance and crease-resistance to textile materials in addition to water-repellent properties are prepared under the same reaction conditions as those employed in preparing the products of Examples 1 to 10 as demonstrated in the following examples.

Example 11

96 parts of methanol and 84 parts of paraformaldehyde are charged to a suitable vessel containing a stirrer, thermometer and reflux condenser. The mixture is then refluxed until all of the paraformaldehyde has dissolved. 60 parts of urea are then added to the reaction mixture and the pH of the same is adjusted to a pH value of about 8–9 with caustic soda. The reaction mixture is then refluxed at a temperature of 70°–75° C. for 15 minutes, cooled to approximately 50° C. and then acidified with phosphoric acid to a pH of approximately 3–3.5. Refluxing of the reaction mixture is then continued for another 15 minutes. 96.7 parts of stearamide are then added to the reaction mixture and after solution of the stearamide is effected, the mixture is heated for one hour at 80°–85° C. At the end of this period, a straw colored translucent liquid resinous condensation product is obtained which is capable of imparting a high degree of crease-resistance and shrink-resistance to fabrics treated therewith.

Example 12

112 parts of methanol, 96 parts of paraformaldehyde, and 0.1 part of caustic soda are heated until solution of the paraformaldehyde is obtained. 76 parts of thiourea are then added thereto and when solution of the same has been obtained, the reaction mixture is refluxed at a temperature of 70°–75° C. for 15 minutes. 66 parts of octadecylamine are then slowly added to the reaction mixture and when addition of the same has been completed, the mixture is refluxed for approximately one hour at 80°–85° C. The product obtained is similar in its properties and characteristics to that of Example 11.

Where it is desired that the treated fabrics have a firmer hand than that obtainable with products of the type illustrated in the foregoing examples, it is possible to secure such effect by treatment of the fabrics with resinous condensation products secured by modifying the aforesaid products by reaction with approximately 0.1 to 0.5 mol of an aliphatic polyhydric alcohol. Suitable polyhydric alcohols which may be employed include ethylene glycol, propylene glycol, diethylene glycol, trimethylene glycol, glycerol pentaerythritol, sorbitol and mannitol. The following examples are illustrative of the preparation of such products.

Example 13

A mixture of 96 parts of methanol and 84 parts of paraformaldehyde are refluxed until solution of the paraformaldehyde is obtained. 60 parts of urea are added thereto and the pH of the mixture is adjusted to a pH value of 8–9 with caustic soda. The mixture is then refluxed for 15 minutes at 70–75° C., cooled to approximately 50° C., acidified with phosphoric acid to a pH of 3–3.5, and refluxed for 15 more minutes at a temperature of 75–80° C. There are then added thereto 10.6 parts of diethylene glycol and 96.7 parts of stearamide and the mixture is then refluxed for one hour at 80–85° C. The product thus secured is a liquid resinous condensation product having the properties of those obtained as described in Examples 11 and 12 but capable of imparting a firmer hand to fabrics treated therewith.

Example 14

The reaction described in Example 13 is duplicated except that in place of the diethyleneglycol there are substituted 9.2 parts of glycerol.

Example 15

The reaction described in Example 13 is duplicated except that in place of diethyleneglycol there are substituted 13.6 parts of pentaerythritol.

The effects produced by the products of the above illustrative examples upon textile materials are shown by the data set forth in the table which follows. Samples of a rayon gabardine fabric were impregnated with the products of Examples 11, 13, 14 and 15, respectively, applied from water emulsions containing 9 percent by weight of the said products and were subsequently cured for 10 minutes at 150° C. It is seen that these products by themselves imparted durable water-repellency, dimensional stability and crease-resistance to the fabric in one operation.

Fabric	Resin Used	Spray Ratings			Angle Crease Resistance	Percent of Shrinkage
		Initial	Dry Cleaned	Washed		
Untreated		0	0	0	115	8.0
Treated	Product of Ex. 11	100	70+	80+	133	2.9
Do	Product of Ex. 13	100	70+	80+	129	2.9
Do	Product of Ex. 14	100	70+	80+	131	3.3
Do	Product of Ex. 15	100	70+	80+	126	3.1

The above tests for water-repellency, crease-resistance and shrink-resistance were made following the standard procedures set up for such determinations by the American Association of Textile Chemists and Colorists as described in its yearbook for the year 1951.

While the above products and processes of making and using the same constitute preferred embodiments of the present invention, changes may be made therein without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. A heat-convertible resinous condensation product suitable for finishing textile materials consisting of the product secured by reacting one mol of a material of the group consisting of urea, thiourea, mono-alkylated ureas, mono-alkylated thiourea, guanyl urea, biuret, dicyandiamide and guanidine with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of an

unsubstituted aliphatic amide containing at least 12 carbon atoms.

2. A heat-convertible resinous condensation product suitable for finishing textile materials consisting of the product secured by reacting one mol of urea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide.

3. A heat-convertible resinous condensation product suitable for finishing textile materials comprising the product secured by reacting one mol of thiourea with 2.5 to 3.5 mols of a material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide.

4. A heat-convertible resinous condensation product suitable for finishing textile materials comprising the product secured by reacting one mol of urea with 2.5 to 3.5 mols of a material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine.

5. A heat-convertible resinous condensation product suitable for finishing textile materials comprising the product secured by reacting one mol of thiourea with 2.5 to 3.5 mols of a material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine.

6. A process for preparing a heat-convertible resinous condensation product suitable for finishing textile materials which consists in reacting one mol of a material of the group consisting of urea, thiourea, mono-alkylated ureas, mono-alkylated thioureas, guanyl urea, biuret, dicyandiamide, and guanidine with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of an unsubstituted aliphatic amide containing at least 12 carbon atoms.

7. A process for preparing a heat-convertible resinous condensation product suitable for finishing textile materials which consists in reacting one mol of urea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide.

8. A process for preparing a heat-convertible resinous condensation product suitable for finishing textile materials which consists in reacting one mol of thiourea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide.

9. A process for preparing a heat-convertible resinous condensation product suitable for finishing textile materials which consists in reacting one mol of urea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine.

10. A process for preparing a heat-convertible resinous condensation product suitable for finishing textile materials which consists in reacting one mol of thiourea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine.

11. A textile material having improved properties of durable water repellency, shrink resistance and crease resistance comprising the product resulting from the impregnation of a textile material with a heat-convertible resinous condensation product secured by reacting one mol of a material of the group consisting of urea, thiourea, mono-alkylated ureas, mono-alkylated thioureas, guanyl urea, biuret, dicyandiamide and guanidine with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of a material of the group consisting of unsubstituted aliphatic amides containing at least 12 carbon atoms, unsubstituted aliphatic amines containing at least 12 carbon atoms, and unsubstituted aliphatic alcohols containing at least 12 carbon atoms, and thereafter subjecting said impregnated material to elevated temperatures to insolubilize the said resinous condensation product.

12. A textile material having improved properties of durable water-repellency, shrink-resistance and crease-resistance comprising the product resulting from the impregnation of a textile material with a heat convertible resinous condensation product secured by reacting one mol of urea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide, and thereafter subjecting said impregnated material to elevated temperatures to insolubilize the said resinous condensation product.

13. A textile material having improved properties of durable water-repellency, shrink-resistance and crease-resistance comprising the product resulting from the impregnation of a textile material with a heat-convertible resinous condensation product secured by reacting one mol of thiourea with 2.5 to 3.5 mols of a material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide, and thereafter subjecting said impregnated material to elevated temperatures to insolubilize the said resinous condensation product.

14. A textile material having improved properties of durable water-repellency, shrink-resistance and crease-resistance comprising the product resulting from the impregnation of a textile material with a heat-convertible resinous condensation product secured by reacting one mol of urea with 2.5 to 3.5 mols of a material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine, and thereafter subjecting said impregnated material to elevated temperatures to insolubilize the said resinous condensation product.

15. A textile material having improved properties of durable water-repellency, shrink-resistance and crease-resistance comprising the product resulting from the impregnation of a textile material with a heat-convertible resinous condensation product secured by reacting one mol of thiourea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine, and thereafter subjecting said impregnated material to elevated temperatures to insolubilize the said resinous condensation product.

16. A textile material having improved properties of durable water-repellency, shrink-resistance and crease-resistance comprising the product resulting from the impregnation of a textile material with a heat-convertible resinous condensation product secured by reacting one mol of urea with 2.5 to 3.5 mols of a material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearyl alcohol, and thereafter subjecting said impregnated material to elevated temperatures to insolubilize the said resinous condensation product.

17. A process of finishing textile materials which comprises the steps of impregnating a textile material with a heat-convertible resinous condensation product secured by reacting one mol of a material of the group consisting of urea, thiourea, mono-alkylated ureas, mono-alkylated thioureas, guanyl urea, biuret, dicyandiamide and guanidine with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of a material of the group consisting of unsubstituted aliphatic amides containing at least 12 carbon atoms, unsubstituted aliphatic amines containing at least 12 carbon atoms, and unsubstituted aliphatic alcohols containing at least 12 carbon atoms, and thereafter subjecting said impregnated textile material to elevated temperatures to insolubilize the said resinous condensation product.

18. A process of finishing textile materials which comprises the steps of impregnating a textile material with a heat-convertible resinous condensation product secured by reacting one mol of urea with 2.5 to 3.5 mols of a substantally anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide, and thereafter subjecting said impregnated textile material to elevated temperatures to insolubilize the said resinous condensation product.

19. A process of finishing textile materials which comprises the steps of impregnating a textile material with a heat-convertible resinous condensation product secured by reacting one mol of thiourea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearamide, and thereafter subjecting said impregnated textile material to elevated temperatures to insolubilize the said resinous condensation product.

20. A process of finishing textile materials which comprises the steps of impregnating a textile material with a heat-convertible resinous condensation product secured by reacting one mol of urea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine, and thereafter subjecting said impregnated textile material to elevated temperatures to insolubilize the said resinous condensation product.

21. A process of finishing textile materials which comprises the steps of impregnating a textile material with a heat-convertible resinous condensation product secured by reacting one mol of thiourea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of octadecylamine, and thereafter subjecting said impregnated textile material to elevated temperatures to insolubilize the said resinous condensation product.

22. A process of finishing textile materials which comprises the steps of impregnating a textile material with a heat-convertible resinous condensation product secured by reacting one mol of urea with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of stearyl alcohol, and thereafter subjecting said impregnated textile material to elevated temperatures to insolubilize the said resinous condensation product.

23. A heat convertible resinous condensation product suitable for finishing textile materials consisting of the product secured by reacting one mol of a material of the group consisting of urea, thiourea, mono-alkylated ureas, mono-alkylated thiourea, guanyl urea, biuret, dicyandiamide and guanidine with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of an unsubstituted aliphatic amine containing at least 12 carbon atoms.

24. A process for preparing a heat convertible resinous condensation product suitable for finishing

textile materials which consists in reacting one mol of a material of the group consisting of urea, thiourea, mono-alkylated ureas, mono-alkylated thioureas, guanyl urea, biuret, dicyandiamide, and guanidine with 2.5 to 3.5 mols of a substantially anhydrous material which furnishes formaldehyde under the reaction conditions and with 3 to 4 mols of an unsubstituted aliphatic alcohol containing up to 4 carbon atoms preliminarily under alkaline conditions and subsequently under acid conditions to secure a resinous partial condensation product thereof, and thereafter reacting said resinous partial condensation product under acid conditions with approximately 0.1 to 2.6 mols of an unsubstituted aliphatic amine containing at least 12 carbon atoms.

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