

Description

The present invention relates to a method of bonding a non-polar or highly crystalline substrate with adhesive, especially with cyanoacrylate adhesive which utilizes a primer to promote the bonding. In particular, the primer promotes bonding of polyolefins or similar plastic substrates with low surface energy.

It is an object of this invention to provide a primer which is useful in bonding non-polar plastics to themselves, or to other substrates, using adhesives, especially cyanoacrylate adhesives. Because of their low surface energy such materials are difficult to bond, even with cyanoacrylate adhesives. These materials are represented by linear polymers of simple olefins, such as polyethylene, polypropylene, polybutene and the like, including their copolymers. Other materials which can be bonded by this invention are substrates having low surface energy such as polyacetals, plasticized PVC (polyvinyl chloride), polyurethane, EPDM (ethylene-propylene diamine monomer) rubber, thermoplastic rubbers based on vulcanized polyolefins and the like.

The materials bonded by this invention have, in general, a waxy, paraffin-like surface character, with a low critical surface tension of wetting and may have at their surface a weak boundary layer. In general, there is an absence of polar groups which are necessary to raise the surface energy to the level needed to give adhesion with conventional adhesives.

Various surface treatments have been used heretofore to improve adhesion of the difficult-to-bond materials described above. These treatments include surface abrasion, corona discharge (J.C. Von der Heide & H.L. Wilson, Modern Plastics 38 9 (1961) p199), flame treatment (E.F. Buchel, British Plastics 37 - (1964) p142), U.V. radiation (Practising Polymer Surface Chemistry D. Dwight, Chemtech (March 1982) p166), plasma treatment, hot chlorinated solvents, dichromate/sulfuric acid and chlorine/U.V. radiation (D.Brewis & D. Briggs, Polymer 22 7 1981) and references therein). All the above treatments are effective to some degree and are generally thought to work by introducing polar groups on non-polar substrates.

While the above treatments may, on occasion, improve the ability of difficult substrates to be bonded with adhesives, the treatments have the disadvantage of requiring specialized apparatus and equipment and can involve corrosive and/or hazardous materials.

Apart from the above treatments, there are examples in the prior art of the use of various accelerators or initiators of the polymerization of the cyanoacrylate monomer. The disadvantage with such accelerators or initiators is that while the speed of cure of the bond is increased, adhesion on non-polar substrates is not promoted and the resulting bond can be very weak and the adhesive can slip off the substrate.

An accelerator comprising a solution of certain amines and a deodorant is disclosed in Japanese Patent Application No. 599066471-A. United States Patent No. 3 260 637 of Von Bramer discloses the use of various classes of organic amines (but specifically excludes primary amines) as accelerators in conjunction with cyanoacrylate adhesives. The compositions of both of these specifications can best be described as accelerators or initiators of the polymerization of cyanoacrylate monomer without improving adhesion on non-polar substrates.

Various primers also have been proposed to promote adhesion. For example, Japanese Patent Applications Nos. 52-98062, 56-141328 and 57-119929 suggest the use of primers prepared by dissolving a chlorinated polyethylene or chlorinated polypropylene or a fatty acid-modified acrylated alkyd resin in an organic acid. In general, however, organic acids tend to inhibit or prevent curing of cyanoacrylate adhesives. The primer of the present invention has been advantage of using a low molecular weight material which is readily soluble in common solvents.

European Specification No. 0 129 069 A2 discloses the use of a primer comprising at least one organometallic compound, for use with alphacyanoacrylate adhesives, which is useful in bonding non-polar substrates. Japanese Application No. 61023630 proposes organometallic primers for joining plastic models. Both of these documents disclose the use of organo-metallic compounds which are potentially highly toxic materials.

Primers for polyolefins comprising (i) modified or grafted polyolefins such as chlorinated polyolefins, ethylene/vinyl copolymer or ethylene/propylene terpolymer, (ii) a crosslinkable binder and (iii) crosslinking agents, are disclosed in European Application No. 187171A. The primer described there is somewhat inconvenient to use and apply due to its rubbery consistency, and heating may be needed to activate the primer on the substrate. In addition the solvents used (e.g. toluene and 1,1,1-trichloroethylene) have an undesirable toxicity.

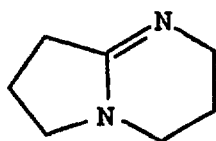
German Application No. DE 3601518-A suggests the use of primers for polyolefins comprising an organometallic compound and an organic polymer; the organometallic compound being a metal alcoholate and the term "metal" including metalloids, phosphorous, boron or silicon atoms. The materials disclosed such as dibutyltin diacetate and other organo-metallic compounds are highly toxic for use as primers.

Japanese Application No. 61136567 describes a titanate primer for bonding polypropylene. The titanate primers give little or no improvement when bonding difficult materials, such as polyethylene, to itself or to other materials, when cyanoacrylate adhesives are employed.

Japanese Application No. 60157940 discloses a primer composition based on a solution of 4-vinyl pyridine as an essential ingredient, and 3, 4-lutidine as an optional ingredient, for bonding polyolefins, polyacetal, polyamide, polyester, boron-polymer, silicone or PVC. However, the disadvantage with the primer of Japanese Application No. 60157940 is that it has a strong odour and, in addition, it does not produce as strong a bond as that produced by the primer of the present invention.

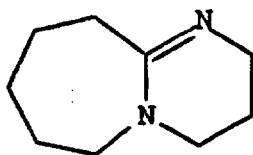
The invention reduces the above problem by providing a method of bonding a non-polar substrate to another substrate which may be polar or non-polar, which comprises treating the non-polar substrate or substrates with an adhesion-promoting primer characterised in that the primer comprises at least one diazabicyclo or triazabicyclo compound selected from

1,5-diazabicyclo[4.3.0]non-5-ene having the formula:-



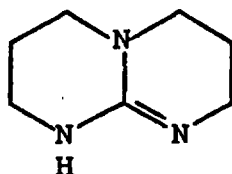
(I)

1,8-diazabicyclo[5.4.0]undec-7-ene having the formula:-



(II)

and 1,5,7-triazabicyclo[4.4.0]dec-5-ene having the formula:-



(III)

applying an alpha-cyanoacrylate adhesive to the substrate or substrates and then adjoining the two substrates.

Preferably the primer also comprises an organic solvent in which the azabicyclo compound is stable, such as acetone, methyl ethyl ketone, 1,1,1-trichloroethane, methanol, 1,1,2-trichloro-1,2,2-trifluoroethane or mixtures thereof with each other or with other solvents such as an azeotropic mixture of 1,1,2-trichloro-1,2,2-trifluoroethane with acetone. The function of the solvent is to provide a suitable concentration of the azabicyclo compound so that a coating of selected thickness can be applied to a surface. Therefore, any common solvent in which the compound is stable will suffice.

While it is well known that solutions of amines and other organic and inorganic bases will accelerate the cure of cyanoacrylate adhesives, it is surprising that the primers of this invention also confer adhesion on non-polar substrates. The curing or polymerisation of a film of cyanoacrylate, between two materials, does not necessarily result in a strong bond, particularly if the materials are non-polar, and if the polymerisation of the cyanoacrylate is excessively rapid, a very weak bond or no bond will result.

The primer composed of one of the above diazabicyclo or triazabicyclo compounds as a solution in a solvent is normally of such concentration that the thickness of the coating can be controlled to achieve the full effects of this invention.

It is preferable that a solution of the diazabicyclo or triazabicyclo compound in the solvent should have a concentration of 0.001 - 30 g/100 ml. Preferred concentrations are 0.01 - 2 g/100 ml.

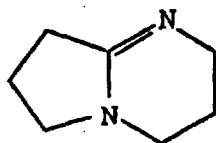
In the case where the substrates to be bonded are both non-polar or otherwise difficult-to-bond materials of that type, both substrates are coated with a solution of primer. This coating may suitably be applied by brush, spray or immersion of the substrate in the primer solution. If the non-polar substrate is to be bonded to a polar or more active substrate, only the non-polar substrate needs to be coated with the primer.

Following application of the primer to the non-polar substrate(s), the bond is completed using cyanoacrylate adhesive in the normal manner.

The invention also provides a 2-part adhesive system comprising (i) an alpha-cyanoacrylate adhesive and (ii) a primer as defined above.

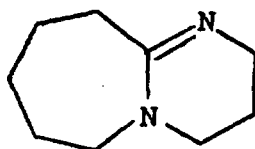
The invention also provides an adhesion-promoting primer composition for use in bonding non-polar substrates comprising at least one diazabicyclo or triazabicyclo compound selected from;

1,5-diazabicyclo[4.3.0]non-5-ene having the formula:



(I)

1,8-diazabicyclo[5.4.0]undec-7-ene having the formula:



(II)

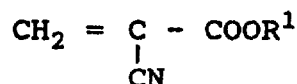
or 1,5,7-triazabicyclo[4.4.0]dec-5-ene having the formula:-



(III)

in a solvent selected from acetone, methyl ethyl ketone, 1,1,1-trichloroethane, methanol, 1,1,2-trichloro-1,2,2-trifluoroethane or mixtures thereof with each other and with other solvents.

Suitable cyanoacrylate adhesives for use with the primer of this invention are represented by the general formula



wherein R¹ is alkyl, alkenyl, cycloalkyl, aryl, alkoxyalkyl, aralkyl, haloalkyl or another suitable group. The lower alkyl alpha-cyanoacrylates are preferred, and in particular methyl, ethyl, n-propyl, n-butyl, isobutyl, isopropyl, allyl, cyclohexyl, methoxyethyl or ethoxyethyl cyanoacrylates are preferred.

Many alpha-cyanoacrylates can be obtained commercially as one component instant adhesives, in which form they may be used in this invention.

While these commercially available cyanoacrylates are composed principally of alpha-cyanoacrylate monomer, the formulation may contain stabilizers, thickeners, adhesion promoters, plasticizers, dyes, heat resistant additives, impact resistance modifiers, perfumes and such like.

A diluted solution of a cyanoacrylate adhesive in a compatible solvent may also be used.

Bonding tests were carried out using various substrates, including natural polyethylene and natural polypropylene as the non-polar substrates, various solutions of the diazabicyclo compounds as the primer and various grades of cyanoacrylate adhesive commercially available from Loctite (Ireland) Limited, Dublin, Ireland. The bond strength of the resulting joints was determined using conventional methods, such as a tensile testing machine.

The following examples will more clearly illustrate the invention.

EXAMPLE 1

0.50g of 1,8-diazabicyclo [5.4.0] undec-7-ene was dissolved in 99.5 ml of Freon TA [trade mark for azeotrope of acetone and 1,1,2-trichloro-1, 2,2-trifluoroethane, available from E.I. Du Pont de Nemours & Co. Inc.] to form a primer solution.

Test pieces of natural polyethylene of dimensions 100 mm x 25 mm and 3mm in thickness were carefully deburred and degreased with acetone. The above primer solution was applied to the test pieces by brush to form a single coating. This coating was allowed to dry (a) 2 minutes; and (b) 5 minutes in air under unforced conditions. Two polyethylene test pieces, both of which were primer coated as above, were then bonded with Loctite 406 [a cyanoacrylate adhesive manufactured by Loctite Corporation, Newington, CT., U.S.A.]. The overlap bond area was 1.61 cm². The bonds were clamped with a force of 4.0 kg/cm² for 24 hours at a temperature of 22 °C.

Test pieces of natural polypropylene of dimensions 100 mm x 25 mm x 3 mm were also prepared and coated with a primer solution as described above and bonded with Loctite 406 adhesive as in the above procedure.

The tensile shear bond strength was then determined on an Instron testing machine at a pulling rate of 200 mm/minute according to Test Method ASTM D1002.

As a control, the above procedure was repeated except that no primer coating was applied to the test pieces.

The results are shown in Table 1.

TABLE 1
TENSILE SHEAR BOND STRENGTHS ON POLYETHYLENE AND POLYPROPYLENE

[Primer Based on 1,8-diazabicyclo (5.4.0) undec-7-ene]				
Coating	Drying Time	Run No.	Tensile Shear Bond Polyethylene/Polyethylene	Strength (Kg/cm ²) Polypropylene/Polypropylene
Primer	2 minutes	1	58	66
Primer	2 minutes	2	53	67
Primer	2 minutes	3	65	37
Primer	5 minutes	1	47	74
Primer	5 minutes	2	57	62
Primer	5 minutes	3	37	38
Control (No Primer)		1	0	8
		2	0	9
		3	0	7
[Adhesive used above was Loctite 406 which is based on ethyl-2-cyanoacrylate.]				

EXAMPLE 2

Primer solutions were prepared by dissolving 0.50g each of 1,5-diazabicyclo [4.3.0] non-5-ene, 1,8-diazabicyclo [5.4.0] undec-7-ene and 1,5,7-triazabicyclo-[4.4.0] dec-5-ene in 99.5 ml of Freon TA.

Test pieces of natural polyethylene were prepared as in Example 1 and both surfaces to be bonded were treated with a single coating of one of the above primers. The coating was allowed to dry in air for 5 minutes. The primed test pieces were then bonded with Loctite 406 cyanoacrylate with the bonds being prepared, aged and tested as in Example 1.

Controls with no primer were also prepared.

The results are shown in Table 2.

TABLE 2

POLYETHYLENE BOND STRENGTHS WITH THE THREE PRIMERS		
Primer Type	Run No.	Tensile Shear Bond Strength (kg/cm ²) Polyethylene/Polyethylene
1,5-diazabicyclo [4.3.0]-non-5-ene	1	48
	2	48
	3	45
1,8-diazabicyclo [5.4.0]-undec-7-ene	1	55
	2	68
	3	62
1,5,7-Triazabicyclo [4.4.0] dec-5-ene	1	40
	2	33
	3	49
Control (No Primer)	1	0
	2	0
	3	0

EXAMPLE 3

The following primer solutions were prepared:

Primer A 1.0g. of 1,8-diazabicyclo [5.4.0] undec-7-ene dissolved in 99.0 ml of Freon TA.

Primer B 0.10g. of 1,8-diazabicyclo [5.4.0] undec-7-ene dissolved in 99.90 ml of Freon TA.

Primer C 0.050g of 1,8-diazabicyclo [5.4.0] undec-7-ene dissolved in 99.95 ml of Freon TA.

Primer D 0.20g of 1,5-diazabicyclo [4.3.0] non-5-ene dissolved in 99.80 ml of Freon TA

Primer E 0.25g of 1,5,7-triazabicyclo [4.4.0] dec-5-ene undissolved in 100 ml of Freon TA

Primer F 0.05g of 1,5,7-triazabicyclo [4.4.0] dec-5-ene dissolved in 100 ml of Freon TA.

Test pieces of natural polyethylene were prepared as in Example 1. These were treated with a single coating of one of the above primers and allowed to dry in air for 5 minutes. Primer was applied to both surfaces to be bonded. The primed test pieces (and unprimed controls) were bonded with Loctite 406 cyanoacrylate adhesive as in Example 1.

The results are shown in Table 3.

TABLE 3PRIMER SOLUTIONS AT VARIOUS CONCENTRATIONS

Run No.	Tensile Shear Bond Strength (kg/cm ²) Polyethylene/Polyethylene	
Primer A	1	56
	2	60
	3	61
Primer B	1	62
	2	80
	3	87
Primer C	1	80
	2	77
	3	87
Primer D	1	45
	2	56
	3	48
Primer E	1	22
	2	29
	3	37
Primer F	1	26
	2	24
	3	25

55 EXAMPLE 4

The primer solution from Example 1 was used to coat test pieces of natural polyethylene which were prepared as in Example 1.

A single coating of the primer was applied to both surfaces to be bonded and allowed to dry in air under unforced conditions for various periods before completing the bond with Loctite 406 cyanoacrylate adhesive. The bonds were aged at 22°C for 24 hours and tested as in Example 1. Test pieces with no primer coating were otherwise bonded and tested as above.

Details of drying times and test results (bond strengths) are in Table 4.

TABLE 4

ON-PART LIFE

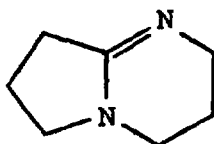
Drying Time Before Bonding Tensile Shear Bond Strength (kg/cm²)
Polyethylene/Polyethylene

		Run 1	Run 2	Run 3
30 seconds		80	77	87
60 "		67	72	67
120 "		58	53	65
300 "		56	60	61
600 "		70	62	55
1,800 "		52	38	58
3,600 "		34	40	36
14,400 "		34	30	29

Controls with no primer gave zero bond strength under above conditions.

Claims

1. A method of bonding a non-polar substrate to another substrate which may be polar or non-polar, which comprises treating the non-polar substrate or substrates with an adhesion-promoting primer characterised in that the primer comprises at least one diazabicyclo or triazabicyclo compound selected from; 1,5-diazabicyclo[4.3.0]non-5-ene having the formula:



(I)

1,8-diazabicyclo[5.4.0]undec-7-ene having the formula:

A single coating of the primer was applied to both surfaces to be bonded and allowed to dry in air under unforced conditions for various periods before completing the bond with Loctite 406 cyanoacrylate adhesive. The bonds were aged at 22°C for 24 hours and tested as in Example 1. Test pieces with no primer coating were otherwise bonded and tested as above.

Details of drying times and test results (bond strengths) are in Table 4.

TABLE 4

ON-PART LIFE

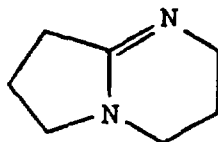
Drying Time Before Bonding	Tensile Shear Bond Strength (kg/cm ²) Polyethylene/Polyethylene		
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14,400 "	34	30	29

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Claims

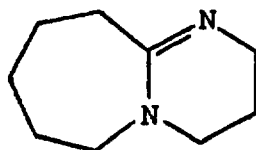
1. A method of bonding a non-polar substrate to another substrate which may be polar or non-polar, which comprises treating the non-polar substrate or substrates with an adhesion-promoting primer characterised in that the primer comprises at least one diazabicyclo or triazabicyclo compound selected from; 1,5-diazabicyclo[4.3.0]non-5-ene having the formula:



(I)

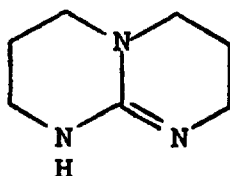
1,8-diazabicyclo[5.4.0]undec-7-ene having the formula:





(II)

or 1,5,7-triazabicyclo[4.4.0]dec-5-ene having the formula:

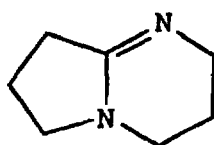


(III)

applying an alpha-cyanoacrylate adhesive to the substrate or substrates and then adjoining the two substrates.

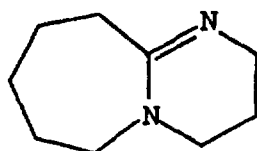
2. The method as claimed in claim 1 characterised in that the primer also comprises an organic solvent in which the diazabicyclo or triazabicyclo compound is stable.
3. The method as claimed in claim 2 characterised in that the solvent is acetone, methyl ethyl ketone, 1,1,1-trichloroethane, methanol, 1,1,2-trichloro-1,2,2-trifluoroethane or mixtures thereof with each other and with other solvents.
4. The method as claimed in claim 2 or 3 characterised in that the solution of at least one diazabicyclo or triazabicyclo compound in the solvent has a concentration of 0.001 to 30 g/100 ml.
5. The method as claimed in claim 4 characterised in that the solution of at least one diazabicyclo or triazabicyclo compound in the solvent has a concentration of 0.01 to 2 g/100 ml.
6. A two-part adhesive system comprising (i) an alphacyanoacrylate adhesive and (ii) a primer as defined in claim 1.
7. The two-part adhesive system as claimed in claim 6 characterised in that the primer also comprises an organic solvent in which the diazabicyclo or triazabicyclo compound is stable.
8. The two-part adhesive system as claimed in claim 7 characterised in that the solvent is acetone, methyl ethyl ketone, 1,1,1-trichloroethane, methanol, 1,1,2-trichloro-1,2,2-trifluoroethane or mixtures thereof with each other and with other solvents.
9. The two-part adhesive system as claimed in claim 7 or 8 characterized in that the solution of the at least one diazabicyclo or triazabicyclo compound in the solvent has a concentration of 0.001 to 30 g/100 ml.
10. The two-part adhesive system as claimed in claim 9 characterised in that the solution of at least one diazabicyclo or triazabicyclo compound in the solvent has a concentration of 0.01 to 2 g/100 ml.
11. An adhesion-promoting primer composition for use in bonding non-polar substrates comprising at least one diazabicyclo or triazabicyclo compound selected from;
 - 1,5-diazabicyclo[4.3.0]non-5-ene having the formula:





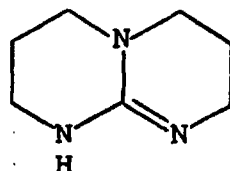
(I)

1,8-diazabicyclo[5.4.0]undec-7-ene having the formula:



(II)

or 1,5,7-triazabicyclo[4.4.0]dec-5-ene having the formula:-



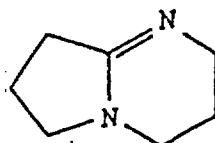
(III)

in a solvent selected from acetone, methyl ethyl ketone, 1,1,1-trichloroethane, methanol, 1,1,2-trichloro-1,2,2-trifluoroethane or mixtures thereof with each other and with other solvents.

12. The primer composition as claimed in claim 11 characterized in that the solvent is an azeotropic mixture of 1,1,2-trichloro-1,2,2-trifluoroethane with acetone.
13. The primer composition as claimed in claim 11 or 12 characterized in that the solution of the at least one diazabicyclo or triazabicyclo compound in the solvent has a concentration of 0.001 to 30 g/100 ml.
14. The primer composition as claimed in claim 13 characterized in that the solution of the at least one diazabicyclo or triazabicyclo compound in the solvent has a concentration of 0.01 to 2 g/100 ml.

Patentansprüche

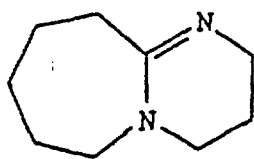
1. Verfahren zum Binden eines nicht-polaren Substrats an ein anderes Substrat, das polar oder nicht-polar sein kann, durch Behandeln des nicht-polaren Substrats oder der Substrate mit einem haftungsfördernden Primer, dadurch gekennzeichnet, daß der Primer wenigstens eine Diazabicyclo- oder Triazabicycloverbindung enthält, ausgewählt aus 1,5-Diazabicyclo[4.3.0]non-5-en der Formel:



(I)

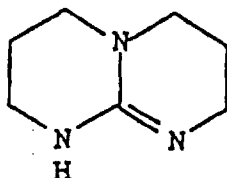
1,8-Diazabicyclo[5.4.0]undec-7-en der Formel:





(II)

oder 1,5,7-Triazabicyclo[4.4.0]dec-5-en der Formel:

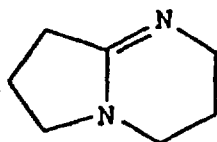


(III)

und Anwenden eines Alpha-Cyanoacrylatklebstoffs auf das Substrat oder die Substrate und dann Verbinden der beiden Substrate.

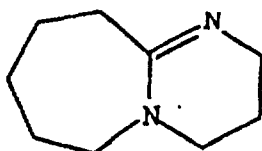
2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Primer ferner ein organisches Lösungsmittel enthält, in dem die Diazabicyclo- oder Triazabicycloverbindung stabil ist.
3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß das Lösungsmittel Aceton, Methylethylketon, 1,1,1-Trichlorethan, Methanol, 1,1,2-Trichlor-1,2,2-trifluorethan oder Mischungen davon untereinander und mit anderen Lösungsmitteln ist.
4. Verfahren nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß die Lösung wenigstens einer Diazabicyclo- oder Triazabicycloverbindung im Lösungsmittel eine Konzentration von 0,001 bis 30 g/100 ml hat.
5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß die Lösung wenigstens einer Diazabicyclo- oder Triazabicycloverbindung im Lösungsmittel eine Konzentration von 0,01 bis 2 g/100 ml hat.
6. Zweikomponentiges Klebstoffsystem, welches (i) einen Alpha-Cyanoacrylatklebstoff und (ii) einen Primer, wie in Anspruch 1 definiert, umfaßt.
7. Zweikomponentiges Klebstoffsystem nach Anspruch 6, dadurch gekennzeichnet, daß der Primer ferner ein organisches Lösungsmittel enthält, in dem die Diazabicyclo- oder Triazabicycloverbindung stabil ist.
8. Zweikomponentiges Klebstoffsystem nach Anspruch 7, dadurch gekennzeichnet, daß das Lösungsmittel Aceton, Methylethylketon, 1,1,1-Trichlorethan, Methanol, 1,1,2-Trichlor-1,2,2-trifluorethan und Mischungen davon untereinander und mit anderen Lösungsmitteln ist.
9. Zweikomponentiges Klebstoffsystem nach Anspruch 7 oder 8, dadurch gekennzeichnet, daß die Lösung der wenigstens einen Diazabicyclo- oder Triazabicycloverbindung im Lösungsmittel eine Konzentration von 0,001 bis 30 g/100 ml hat.
10. Zweikomponentiges Klebstoffsystem nach Anspruch 9, dadurch gekennzeichnet, daß die Lösung der wenigstens einen Diazabicyclo- oder Triazabicycloverbindung im Lösungsmittel eine Konzentration von 0,01 bis 2 g/100 ml hat.
11. Haftungsfördernde Primerzusammensetzung zur Verwendung beim Verbinden nicht-polarer Substrate, welcher wenigstens eine Diazabicyclo- oder Triazabicycloverbindung, ausgewählt aus 1,5-Diazabicyclo[4.3.0]non-5-en der Formel:





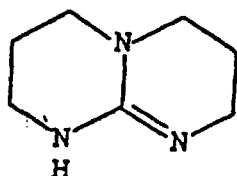
(I)

1,8-Diazabicyclo[5.4.0]undec-7-en der Formel:



(II)

oder 1,5,7-Triazabicyclo[4.4.0]dec-5-en der Formel:



(III)

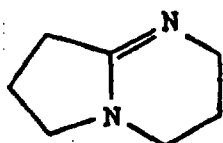
in einem Lösungsmittel umfaßt, das aus Aceton, Methyläthylketon, 1,1,1-Trichlorethan, Methanol, 1,1,2-Trichlor-1,2,2-trifluorethan oder Mischungen davon untereinander und mit anderen Lösungsmitteln ausgewählt ist.

12. Primerzusammensetzung nach Anspruch 11, dadurch gekennzeichnet, daß das Lösungsmittel eine azeotrope Mischung von 1,1,2-Trichlor-1,2,2-trifluorethan mit Aceton ist.
13. Primerzusammensetzung nach Anspruch 11 oder 12, dadurch gekennzeichnet, daß die Lösung der wenigstens einen Diazabicyclo- oder Triazabicycloverbindung im Lösungsmittel eine Konzentration von 0,001 bis 30 g/100 ml hat.
14. Primerzusammensetzung nach Anspruch 13, dadurch gekennzeichnet, daß die Lösung der wenigstens einen Diazabicyclo- oder Triazabicycloverbindung im Lösungsmittel eine Konzentration von 0,01 bis 2 g/100 ml hat.

Revendications

1. Un procédé pour coller un substrat non polaire à un autre substrat qui peut être polaire ou non polaire, qui consiste à traiter le ou les substrats non polaires avec un primaire améliorant l'adhérence, caractérisé en ce que le primaire comprend au moins un composé diazabicyclique ou triazabicyclique choisi parmi :

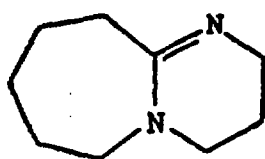
le 1,5-diazabicyclo[4.3.0]non-5-ène de la formule :



(I)

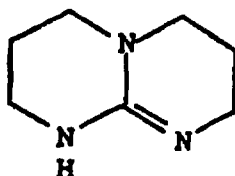
le 1,8-diazabicyclo[5.4.0]undéc-7-ène de la formule :





(II)

ou le 1,5,7-triazabicyclo[4.4.0]déc-5-ène de la formule :

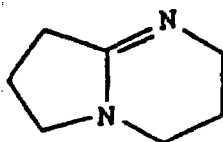


(III)

à appliquer un adhésif du type alpha-cyanoacrylate au substrat ou aux substrats, puis à assembler les deux substrats.

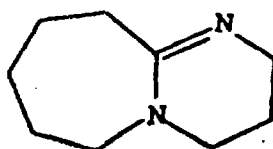
2. Le procédé tel que revendiqué dans la revendication 1, caractérisé en ce que le primaire comprend également un solvant organique dans lequel le composé diazabicyclique ou triazabicyclique est stable.
3. Le procédé tel que revendiqué dans la revendication 2, caractérisé en ce que le solvant est choisi parmi l'acétone, la méthyléthylcétone, le 1,1,1-trichloréthane, le méthanol, le 1,1,2-trichloro-1,2,2-trifluoréthane ou leurs mélanges entre eux et avec d'autres solvants.
4. Le procédé tel que revendiqué dans la revendication 2 ou 3, caractérisé en ce que la solution d'au moins un composé diazabicyclique ou triazabicyclique dans le solvant a une concentration de 0,001 à 30 g/100 ml.
5. Le procédé tel que revendiqué dans la revendication 4, caractérisé en ce que la solution d'au moins un composé diazabicyclique ou triazabicyclique dans le solvant a une concentration de 0,01 à 2 g/100 ml.
6. Un système d'adhésif à deux composants comprenant (i) un adhésif du type alpha-cyanoacrylate et (ii) un primaire tel que défini dans la revendication 1.
7. Le système d'adhésif à deux composants tel que revendiqué dans la revendication 6, caractérisé en ce que le primaire comprend également un solvant organique dans lequel le composé diazabicyclique ou triazabicyclique est stable.
8. Le système d'adhésif à deux composants tel que revendiqué dans la revendication 7, caractérisé en ce que le solvant est choisi parmi l'acétone, la méthyléthylcétone, le 1,1,1-trichloréthane, le méthanol, le 1,1,2-trichloro-1,2,2-trifluoréthane ou leurs mélanges entre eux et avec d'autres solvants.
9. Le système d'adhésif à deux composants tel que revendiqué dans la revendication 7 ou 8, caractérisé en ce que la solution d'au moins un composé diazabicyclique ou triazabicyclique dans le solvant a une concentration de 0,001 à 30 g/100 ml.
10. Le système d'adhésif à deux composants tel que revendiqué dans la revendication 9, caractérisé en ce que la solution d'au moins un composé diazabicyclique ou triazabicyclique dans le solvant a une concentration de 0,01 à 2 g/100 ml.
11. Une composition de primaire améliorant l'adhérence à utiliser pour coller des substrats non polaires, comprenant ou moins un composé diazabicyclique ou triazabicyclique choisi parmi :
le 1,5-diazabicyclo[4.3.0]non-5-ène de la formule :





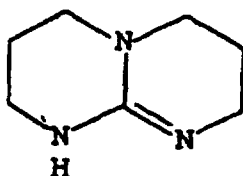
(I)

le 1,8-diazabicyclo[5.4.0]undéc-7-ène de la formule :



(II)

ou le 1,5,7-triazabicyclo[4.4.0]déc-5-ène de la formule :



(III)

dans un solvant choisi parmi l'acétone, la méthyléthylcétone, le 1,1,1-trichloréthane, le méthanol, le 1,1,2-trichloro-1,2,2-trifluoréthane ou leurs mélanges entre eux et avec d'autres solvants.

12. La composition de primaire telle que revendiquée dans la revendication 11, caractérisée en ce que le solvant est un mélange azéotrope de 1,1,2-trichloro-1,2,2-trifluoréthane avec l'acétone.
13. La composition de primaire telle que revendiquée dans la revendication 11 ou 12, caractérisée en ce que la solution d'au moins un composé diazabicyclique ou triazabicyclique dans le solvant a une concentration de 0,001 à 30 g/100 ml.
14. La composition de primaire telle que revendiquée dans la revendication 13, caractérisée en ce que la solution d'au moins un composé diazabicyclique ou triazabicyclique dans le solvant a une concentration de 0,01 à 2 g/100 ml.

