Description

This invention relates to single coat fluorocarbon protective coatings providing the apppearance of anodized aluminum, such coatings being particularly useful for the coating of aluminum in the formation of coated aluminum panels for architectural purposes.

Coated aluminum panels are now in use in buildings where they must have an attractive appearance which will withstand long periods of exposure to the elements. Since the aluminum panel itself will not sustain such exposure, industry now either employs sealed anodized aluminum or coats the aluminum with fluorocarbon polymer coatings. Both of these alternatives possess significant disadvantages.

The production of sealed anodized aluminum introduces expense and hazard and the products are inadequate for several reasons. First, the anodized aluminum cannot be postformed without cracking, as is required to convert a coil of anodized aluminum into window sealers and panel structures. Second, although the anodized layer is very hard, it does not adequately resist abrasion, and is scratched when it rubs against a sharp-edged metallic object. These scratches are highly visible. Third, and while the anodized layer can be dyed, these dyes are not light stable and change color with time, so colored anodized surfaces are not practical. Even if tin colorants are used, which requires expensive processing, the anodized surface still has the above defects. Moreover, the anodized surfaces are rapidly degraded by contact with strong bases, such as caustic and amines. Acids are also not well resisted, such as hydrochloric acid, sulfuric acid, nitric acid and phenol. As a matter of interest, the anodized products discussed above are sealed in boiling water to render them nonporous.

The coating of aluminum with fluorocarbon polymer coatings is also subject to various inadequacies. First, it is usually necessary to apply three layers, a primer, a properly pigmented layer and then a topcoat. This adds to the expense of the coating system. Moreover, these coatings are medium gloss vividly colored systems, and thus they do not resemble the low gloss transparent surfaces provided by anodization.

As will be evident, the industry has desired a simple coating system which would provide a durable coating for aluminum which would resemble an anodized surface, but which would accept postforming without cracking and be more abrasion resistant than the anodized surfaces now available. It was also desired to have a coating which would resist both acids and bases. These objectives as well as the correction of the other noted inadequacies are included in this invention.

Disclosure of Invention

In accordance with this invention, a thermosetting solvent solution coating composition is provided which cures to provide the appearance of of anodized aluminum, comprising a dispersion of a fluorocarbon polymer in volatile organic solvent, said dispersion being pigmented with a finely divided mica and an aluminium flake to provide a combination of whiteness and transparancy providing an anodized aluminium appearance, said pigmented dispersion containing a combination of a thermosetting hydroxy-functional, solvent-soluble acrylic copolymer of monoethylenically unsaturated monomers containing from 3% to 35% of hydroxy-functional monoethylenic monomer and a curing agent therefor, the amount of the hydroxy-functional acrylic copolymer being 5 to 50 % by weight of the total resin solids, and the amount of the curing agent being from 3 to 30 % by weight of the hydroxy-functional acrylic copolymer; to provide a thermosetting cure which enhances the hardness and abrasion resistance of the coating; and wherein said mica is used in a weight ratio with respect to said aluminum flake of from 1:1 to 6:1 and said mica and aluminum flake together are used in a weight ratio with respect to said fluorocarbon polymer, acrylic copolymer and curing agent of from 0.05 to 0.4.; and enough additional pigment to provide sufficient coloration to allow production control without providing enough opacity to hide the witheness and metallic appearance provided by the combination of mica and aluminum flake.

Prefered embodiments are recited in the dependend claims.

In particular, the dispersion of the fluorocarbon polymer preferably contains finely divided particles of polyvinylidene fluoride polymer, in a volatile organic solvent. Preferably, the finely divided mica is coated with 10 to 45 %, more preferably 15 to 30 %, of titanium dioxide for enhanced whiteness. The aluminum flake is preferably acid-resistant. The curing agent for the hydroxy-functional acrylic copolymer is preferably an aminoplast resin.

In preferred practice, a flatting agent is added to reduce the gloss, preferably into the range of 10-20% reflectance measured on a 60° gloss meter. This reduced gloss makes the cured coating more strongly resemble anodized aluminum. It is also desirable to add a wax to provide surface lubricity which aids mar resistance, the addition of wax for this purpose being conventional.

The resulting compositions, when applied to aluminum substrates and baked at a temperature sufficiently high to coalesce the dispersed particles of fluorocarbon polymer into a continuous film, has

the transparent appearance of anodized aluminum and may be clear or tinted to any desired color. The coatings are very durable and retain their color on exterior exposure. The coatings also resist both acids and alkalis, and the coated aluminum can be postformed into panels without cracking. The preferred compositions are uniform in appearance and strongly resist change of color on exposure to the elements without overcoating as well as delamination from the aluminum substrate.

Curiously, it is important to apply the coatings of this invention directly to the aluminum substrate and not to the primers previously used for adhering fluorocarbon polymers to such substrates. In prior practice these primers were needed to get good adhesion, but in this invention it is found that the conventional primers reduce adhesion and actually cause discoloration and delamination on exterior exposure.

It is desired to point out that the compositions of this invention have a relatively high solids content which helps to apply coatings which have a dry thickness of at least 0.5 mil. (13 μm) In preferred coil coating practice, the cured coatings have a thickness of from 0.7 to 1.2 mil (18 to 30 μm), and in the preferred practice of spray coating, the cured coatings preferably have a thickness of from 1.2 to 2.0 mils. (30 to 51 μm)

The main difference between coil coating compositions and spray coating compositions is that spray coatings usually involve organic solvents which are less odorous. Accordingly, the isophorone solvent preferred in coil coating compositions is replaced by 2-ethoxy ethanol acetate which has a less objectionable smell. Also, a lower viscosity is needed for spray application (typically 20-25 seconds with a No. 2 Zahn cup), so the solvent content may be increased to provide the desired spray viscosity.

Thermosetting acrylics are known to modify flourocarbon coatings by increasing their hardness and solvent resistance, and these are known to include N-methylol-functional acrylic copolymers. However, these do not provide the clearest coatings, so it is proposed in this invention to employ a combination of an hydroxy-functional acrylic copolymer together with a curing agent therefor. These, especially with an aminoplast curing agent, enable one to obtain better color, higher solids content coating compositions, and harder and more solvent-resistant cured coatings.

While aminoplast resins are preferred for curing the hydroxy-functional acrylic copolymer, it is also possible to use any curing agent reactive with hydroxy functionality, such as phenoplast resins or blocked polyisocyanates.

Various solvents are commonly used for thinning the compositions of this invention to the viscosity desired for application, such as methyl ethyl ketone, toluene, xylene, butyl acetate, ethyl acetate, and the like. The selection is made based on ambient conditions and the preference of the coating applicator. The compositions of this invention, as shipped prior to thinning to application viscosity, possess a high resin solids content of at least about 35%, preferably in the range of 40% to 55%.

The mica must be finely divided, platelets having their longest dimension preferably less than 100 μm being preferred. A product from the Mearl Corporation (New York, NY) identified as Exterior Mearlin® Bright White being preferred. This product contains 72-78% mica, 22-28% titanium dioxide coated thereon, and has a platelet size (longest dimension) ranging from 10-35 μm. Another particularly useful mica which may be used is AFFLAIR® pearl luster pigments available from EM Chemicals (Hawthorne, NY).

The aluminum flake should also be finely divided, it being preferred that all of the flake pass through a 100 mesh (0.15 mm) screen. A preferred commercial product is Sparkle Silver 3141-ST® which is an aluminum paste produced by Silberline Manufacturing Co., Inc. of Lansford, PA. The aluminum flake in this product is non-leafing and acid-resistant and 99% passes through a 325 mesh (0.044 mm) screen.

Referring more particularly to the proportion of mica and aluminum flake, these together provide the bulk of the pigment solids. The total weight ratio of mica and aluminum flake to resin solids is preferably in the range of from 0.1 to 0.3. The mica is preferably used in a weight ratio with respect to the aluminum of from 2:1 to 5:1.

The fluorocarbon polymer is preferably a homopolymer of vinylidene fluoride, i.e., polyvinylidene fluoride, but one may also employ copolymers of vinylidene fluoride containing a major proportion of vinylidene fluoride. These copolymers desirably contain at least 95 mol percent of the vinylidene fluoride. Suitable comonomers are the halogenated ethylenes, such as symmetrical dichlorodifluoroethylene, 1,1-2-trifluoro-2-chloroethylene, tetrafluoroethylene, vinyl chloride, vinyl acetate, and others. While vinylidene fluoride homopolymer is the preferred fluorocarbon polymer, the corresponding vinyl fluoride polymers and copolymers (including terpolymers, etc.) are also useful.

It is found that it is preferred that the fluorocarbon polymer be in finely divided form, and polyvinylidene fluoride in such form is commercially available under the trade designation Foraflon® from Atochem (Glen Rock, NJ).

The preferred proportion of the fluorocarbon polymer component is at least about 47% of total resin solids, preferably at least 70%. The preferred

fluorocarbon polymer is polyvinylidene fluoride, the Foraflon® product being preferred. One may also use Kynar 500® from Pennwalt (King of Prussia, PA), or the product Solef® from Soltex Polymer Corporation (Houston, TX).

The hydroxy-functional copolymer is subject to wide variation so long it is a solvent-soluble copolymer of monoethylenic monomers containing at least about 3% up to about 35% of hydroxy monomer. The hydroxy functionality is essentially the only reactive group in the copolymer, albeit a small amount of carboxyl functionality is permissible, though not essential. The preferred hydroxy monomer content is from 5% to 15%.

Various hydroxy-functional monomers can be used, but it is preferred to use an hydroxyalkyl ester of a monocarboxylic acid, such as acrylic acid or methacrylic acid. The alkyl groups contemplated are primarily those containing from 2-4 carbon atoms and illustrated by ethyl, propyl or butyl. The preferred hydroxy-functional monomer is 2-hydroxyethyl acrylate. Hydroxy alkyl ethers, such as the hydroxyethyl ether of allyl alcohol, are also useful.

The hydroxy-functional copolymer is preferably the copolymer produced by solution copolymerization in the presence of free-radical polymerization catalyst of monoethylenically unsaturated monomers including the required proportion of hydroxyalkyl acrylate. The other monomers are preferably acrylic esters and methacrylic esters with alcohols containing from 1 to 12 carbon atoms, preferably 1 or 2 carbon atoms. Most preferably, the other monomers consist of at least 50% of methyl methacrylate and the balance ethyl acrylate, most preferably from 55% to 65% methyl methacrylate, balance ethyl acrylate.

The hydroxy-functional copolymer can be used preferably in an amount of from 20% to 45% of total resin solids. The curing agent is used in an amount sufficient to cure the hydroxy-functional copolymer, preferably in an amount of from 5% to 15% of the weight of the hydroxy-functional copolymer.

The preferred aminoplast curing agent is simply a formaldehyde condensate with an amine, preferably melamine, to provide a heat-hardening methylol-functional resin. While many aminoplast resins are broadly useful, such as urea formaldehyde condensates and benzoguanamine formaldehyde condensates, it is preferred that the aminoplast resin be a polyalkoxymethyl melamine resin in which the alkoxy group contains from 1-4 carbon atoms. Appropriate melamine-formaldehyde condensates are readily available in commerce and are usually etherified with lower alcohols for use in organic solvent solution, as is well known.

Blocked isocyanate curing agents are also useful, such as isophorone diisocyanate blocked with methyl ethyl ketoxime or octyl alcohol-blocked 2,4-toluene diisocyanate. The class of blocked isocyanate curing agents is well known, and these agents are well known to effect cure by forming urethane groups with the hydroxy functionality on the coating composition when baking causes the blocked isocyanate groups to dissociate and become active.

All ratios and proportions herein are by weight, unless otherwise stated.

The volatile solvents are selected in accordance with common practice for the formulation of baked coatings. Thus, ether acetate solvents and isophorone are preferred, as will be illustrated, and ketones, like methyl ethyl ketone, or aromatic hydrocarbons, like xylene are usually used to thin the compositions to desired viscosity.

The inorganic pigments which are used are preferably those which introduce as little opacity as possible. Thus, iron oxide pigments are particularly useful to provide brown, red or yellow coloration. When titanium dioxide is used, its proportion of use is minimized to avoid unduly hiding the metallic appearance provided by the mica and aluminum flake. Carbon black is useful since a small amount of it insufficient to hide the metallic appearance can provide an attractive and deep black appearance. An appropriate proportion of carbon black is illustrated by from 5 to 10 pounds (2.27 to 4.54 kg) thereof per 100 gallons (378.5 l) of coating composition. One can also use a ceramic pigment, such as a copper-chrome (Shepherd® #1 [Cinncinatti, OH] may be used), but these are more costly.

While acidic catalysts may be included in the composition, they are not needed herein because the curing temperatures for the polyvinylidene fluoride polymer is high enough so that N-methylol cure of the hydroxy-functional copolymer does not require any added catalyst.

The invention is illustrated in the following example of preferred practice.

Example

Premix 60 pounds (27 kg) of finely divided mica pigment coated with about 25% of titanium dioxide (Mearl Corporation product identified hereinbefore as Exterior Mearlin® Bright White may be used), 18 pounds (8.16 kg) of an acid-resistant aluminum flake pigment (Sparkle Silver® 3141-ST described previously may be used) in 36 pounds (16.3 kg) of xylol and 63 pounds (28.6 kg) of 2-butoxy diethylene glycol acetate. This premix is then thinned with 637 pounds (289 kg) of a 50% dispersion of a finely divided polyvinylidene flu-

oride homopolymer in isophorone (the finely divided polyvinylidene fluoride homopolymer provided by Atochem may be used) and 144 pounds (65.3 kg) of an hydroxy-functional copolymer (a 55% solids content solution of an hydroxy-functional acrylic copolymer in dipropylene glycol mono-acetate). The hydroxy-functional acrylic copolymer is a solution copolymer of 25% ethyl acrylate, 70% methyl methacrylate, and 5% of 2-hydroxyethyl acrylate.

There is then added 15 pounds (6.8 kg) of an etherified melamine-formaldehyde condensate [90% solution in organic solvent] (Monsanto product Resimene 740® or American Cyanamid product Cymel 303® [when thinned to 90% solids] may be used).

Then various colorations are added in small amounts in the form of shading pastes which are predispersions of pigments in organic solvent. In this way 4 pounds (1.82 kg) of titanium dioxide rutile, 0.5 pounds (0.227 kg) of carbon black, 0.4 pounds (0.18 kg) of red iron oxide and 0.5 pounds (0.227 kg) of yellow iron oxide are added. These shading pastes contribute minimum coloration to provide a clear silver-colored coating. The named proportions are enough to mask nonuniformities in the aluminum being coated and contaminations introduced by the various ingredients and contact with the production equipment, but there is too little of these colorants to be significantly visible. As a result, the composition of this invention when applied onto an aluminum plate and baked looks like sealed anodized aluminum.

The foregoing provides a composition suitable for coil coating by reverse roll coating (about 40% volume solids). For spray application additional solvent, such as xylol, toluol, methyl ethyl ketone or 2-butoxy ethanol, or the like, is added to about 25% to 30% volume solids. The viscosity desired will vary depending upon the spray equipment and atmospheric conditions.

When it is desired to have the clear appearance produced above modified by a color tint, then the proportion of added pigment is increased to provide the desired color. However, the proportion of pigment should be insufficient to render the coating substantially opaque which would destroy the anodized aluminum appearance.

To illustrate the production of a tinted product, the above example is modified by adding 5 pounds (2.27 kg) of lampblack per 100 gallons (378.5 l) of the above clear composition. This is not enough to hide the sealed anodized appearance, but it introduces a deep black tint without destroying the transparent metallic appearance which is very attractive and hard to provide in the absence of this invention.

In some of the darker tinted products using spray application, the aluminum flake may be omitted. Spray allows thicker films, and with the darker colors, the whiteness provided by the aluminum flake is less prominent and can be omitted. To illustrate this modification of the invention, using 6-8 pounds (2.72 - 3.65 kg) of lampblack per 100 gallons (378.5 l) of the above clear composition, and applying the composition by spray to deposit a dry film having a thickness of from 1.7-2.0 mils (43 - 51 μm), the aluminum flake may be omitted.

The baking temperatures are not critical, but must be high enough to cause the polyvinylidene fluoride homopolymer particles, which are partly in solution and partly in dispersion, to coalesce into a continuous film. A temperature of at least about 450°F. (232°C) for at least about 10 minutes is adequate for this purpose, and this is more than ample to cure the hydroxy copolymer to provide enhanced solvent resistance and improved hardness. In coil coating processes, the oven dwell temperature is sometimes only about 30 seconds, so an oven temperature in the range of 600°F. to 800°F. (316 - 427°C) should be used.

In preferred practice, 1 pound (0.45 kg) of a flatting agent, such as Degussa product OK-412 may be added to reduce the 60° gloss reading into the 10-20 range, and 34 pounds (15.4 kg) of a 30% xylene solution of wax, such as Polymekon® wax, is added to improve surface lubricity and thus, to improve mar resistance. The proportion of flatting agent may be increased up to about 10 pounds (45.4 kg).

It is helpful in this invention to employ aluminum of high quality and cleanliness. It is also desirable to pretreat the aluminum (class 1 pretreatment for spray application and class 2 pretreatment for coil application). These class designations are in accordance with ASTM D-1730. The above practices are not an essential of what has been invented, but instead represent routine procedure for the coating of aluminum to enable best performance.

Claims

1. A thermosetting solvent solution coating composition which cures to provide the appearance of of anodized aluminum comprising a dispersion of a fluorocarbon polymer in volatile organic solvent, said dispersion being pigmented with a finely divided mica and an aluminium flake to provide a combination of whiteness and transparancy providing an anodized aluminium appearance, said pigmented dispersion containing a combination of a thermosetting hydroxy-functional, solvent-soluble acrylic copolymer of monoethylenically unsaturated

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Claims

1. A thermosetting solvent solution coating composition which cures to provide the appearance of of anodized aluminum comprising a dispersion of a fluorocarbon polymer in volatile organic solvent, said dispersion being pigmented with a finely divided mica and an aluminium flake to provide a combination of whiteness and transparancy providing an anodized aluminium appearance, said pigmented dispersion containing a combination of a thermosetting hydroxy-functional, solvent-soluble acrylic copolymer of monoethylenically unsaturated

monomers containing from 3% to 35% of hydroxy-functional monoethylenic monomer and a curing agent therefor, the amount of the hydroxy-functional acrylic copolymer being 5 to 50 % by weight of the total resin solids, and the amount of the curing agent being from 3 to 30 % by weight of the hydroxy-functional acrylic copolymer; to provide a thermosetting cure which enhances the hardness and abrasion resistance of the coating; and wherein said mica is used in a weight ratio with respect to said aluminum flake of from 1:1 to 6:1 and said mica and aluminum flake together are used in a weight ratio with respect to said fluorocarbon polymer, acrylic copolymer and curing agent of from 0.05 to 0.4.; and enough additional pigment to provide sufficient coloration to allow production control without providing enough opacity to hide the witheness and metallic appearance provided by the combination of mica and aluminum flake.

2. A coating composition as recited in claim 1 in which said mica is coated with from 10% to 45% of titanium dioxide based on the weight of the coated mica and the platelets of said mica have a longest dimension of less than 100 µm, said aluminum flake is acid-resistant and passes through a 100 mesh (0.15 mm) screen, a flatting agent is present to reduce the gloss into the range of 10-20% reflectance measured on a 60° gloss meter, and a wax is added to provide surface lubricity which aids mar resistance.

3. A coating composition as recited in claim 1 in which said fluorocarbon polymer is provided by finely divided particles of polyvinylidene fluoride homopolymer,

4. A coating composition as recited in claim 1 in which said hydroxy-functional copolymer consists of acrylic monomers, said hydroxy monomer is an hydroxyalkyl acrylate or methacrylate containing from 2 to 4 carbon atoms in the alkyl group present in an amount of from 5% to 15%, and said copolymer is present in an amount of from 20% to 45% of total resin solids and comprises at least 50% of methyl methacrylate.

5. A coating composition as recited in claim 1 in which said fluorocarbon polymer is provided by finely divided particles of polyvinylidene fluoride homopolymer present in an amount of at least about 47% of total resin solids, and said curing agent is an aminoplast resin.

6. A coating composition as recited in claim 5 in which said aminoplast resin is a polyalkoxymethyl melamine resin containing from 1 to 4 carbon atoms in the alkoxy group and present in an amount of from 3% to 30% of said hydroxy-functional copolymer.

7. A coating composition as recited in claim 1 in which said fluorocarbon polymer is provided by a dispersion of a polyvinylidene fluoride in volatile organic solvent, said polyvinylidene fluoride being present in an amount of at least about 47% of total resin solids, said dispersion being pigmented with a finely divided mica coated with from 10% to 45% of titanium dioxide based on the weight of the coated mica, the platelets of said mica have a longest dimension of less than 100 µm, and an aluminum flake to provide a combination of whiteness and transparancy providing an anodized aluminum appearance, said aluminum flake being acid-resistant and passing through a 100 mesh (0.15 mm) screen, said pigmented dispersion containing an hydroxy-functional acrylic copolymer and an aminoplast curing agent therefor, said mica being used in a weight ratio with respect to said aluminum flake of from 1:1 to 6:1 and said mica and aluminum flake together being used in a weight ratio with respect to said polyvinylidene fluoride polymer, acrylic copolymer and aminoplast curing agent of from 0.05 to 0.4, a flatting agent to reduce the gloss into the range of 10-20% reflectance measured in a 60° gloss meter, and a wax providing surface lubricity which aids mar resistance.

8. A coating composition as recited in claim 7 in which said additional pigment is used in an amount sufficient to tint the coating to provide deep coloration without providing enough opacity to hide the transparent metallic appearance provided by said mica.

Patentansprüche

1. Hitzehärtende Überzugsmasse als Lösung in einem Lösungsmittel, welche aushärtet, um das Aussehen von anodisiertem Aluminium zu ergeben, enthaltend eine Dispersion eines Fluorkohlenstoff-Polymers in einem flüchtigen organischen Lösungsmittel, die mit feinteiligem Glimmer und Aluminiumflocken pigmentiert ist, um eine Kombination der Weiße und der Transparenz mit dem Aussehen von anodisiertem Aluminium zu ergeben, wobei die pigmentierte Dispersion eine Kombination eines hitzehärtbaren, hydroxyfunktionellen, in einem Lö-

sungsmittel löslichen Acryl-Copolymers von monoethylenisch ungesättigten Monomeren, enthaltend 3 bis 35% hydroxyfunktionelles monoethylenisches Monomer und einen Härter hierfür enthält, wobei die Menge des hydroxyfunktionellen Acryl-Copolymers 5 bis 50 Gew.-% der gesamten Harzfeststoffe beträgt und die Menge des Härters 3 bis 30 Gew.-% des hydroxyfunktionellen Acryl-Copolymers ausmacht; um eine hitzehärtende Aushärtung zu erzeugen, die die Härte und die Abriebfestigkeit des Überzugs verbessert; und worin der Glimmer in einem Gewichtsverhältnis zu den Aluminiumflocken von 1:1 bis 6:1 verwendet wird, und der Glimmer und die Aluminiumflokken zusammen in einem Gewichtsverhältnis zu dem Fluorkohlenstoff-Polymer, dem Acryl-Copolymer und dem Härter von 0,05 bis 0,4 verwendet werden; und worin genügend zusätzliches Pigment für eine ausreichende Färbung vorhanden ist, um eine Produktionskontrolle zu ermöglichen, ohne daß die Opazität zu groß wird, um die Weiße und das metallische Aussehen, die durch die Kombination von Glimmer und Aluminiumflocken bedingt sind, zu verbergen.

2. Überzugsmasse nach Anspruch 1, worin der Glimmer mit 10 bis 45% Titandioxid, bezogen auf das Gewicht des beschichteten Glimmers überzogen ist und die Plättchen des Glimmers eine längste Abmessung von weniger als 100µm haben, wobei die Aluminiumflocken säurebeständig sind und durch ein Sieb mit einer Maschenweite von 100 mesh (0,15 mm) hindurchgehen, wobei ein Mattierungsmittel vorhanden ist, um den Glanz bis in den Bereich von 10 bis 20% Reflektanz (gemessen auf einem 60°-Glanzmeßgerät) zu reduzieren, und wobei ein Wachs zugesetzt ist, um eine Oberflächenschmierung zu erzeugen, die die Kratzfestigkeit erhöht.

3. Überzugsmasse nach Anspruch 1, worin das Fluorkohlenstoff-Polymer aus feinteiligen Teilchen von Polyvinylidenfluorid-Homopolymer zusammgesetzt ist.

4. Überzugsmasse nach Anspruch 1, worin das hydroyfunktionelle Copolymer aus Acrylmonomeren besteht, das Hydroxy-Monomer ein Alkylacrylat oder -methacrylat mit 2 bis 4 Kohlenstoffatomen in der Alkylgruppe darstellt und in einer Menge von 5 bis 15% vorhanden ist, und worin das Copolymer in einer Menge von 20 bis 45%, bezogen auf die gesamten Harzfeststoffe vorhanden ist und mindestens 50% Methylmethacrylat enthält.

5. Überzugsmasse nach Anspruch 1, worin das Fluorkohlenstoff-Polymer aus feinen Teilchen aus Polyvinylidenfluorid-Homopolymer in einer Menge von mindestens etwa 47% der Gesamtfeststoffe zusammengesetzt ist und der Härter ein Aminoplastharz darstellt.

6. Überzugsmasse nach Anspruch 5, worin das Aminoplastharz ein Polyalkoxymethyl-Melaminharz mit 1 bis 4 Kohlenstoffatomen in der Alkoxygruppe darstellt und in einer Menge von 3 bis 30%, bezogen auf das hydroxyfunktionelle Copolymer, vorhanden ist.

7. Überzugsmasse nach Anspruch 1, worin das Fluorkohlenstoff-Polymer eine Dispersion eines Polyvinylidenfluorids in einem flüchtigen organischen Lösungsmittel darstellt und in einer Menge von mindestens etwa 47% der gesamten Harzfeststoffe vorhanden ist, wobei die Dispersion mit einem feinteiligen Glimmer, der mit 10 bis 45% Titandioxid, bezogen auf das Gewicht des beschichteten Glimmers, überzogen ist und die Plättchen des Glimmers eine längste Abmessung von weniger als 100µm haben, sowie mit Aluminiumflocken pigmentiert sind, um eine Kombination der Weiße und der Transparenz mit dem Aussehen von anodisiertem Aluminium zu ergeben, wobei die Aluminiumflocken säurebeständig sind und durch ein Sieb mit einer Maschenweite von 100 mesh (0,15 mm) hindurchgehen, wobei die pigmentierte Dispersion ein hydroxyfunktionelles Acryl-Copolymer und einen Aminoplast-Härter hierfür enthält, wobei der Glimmer in einem Gewichtsverhältnis zu den Aluminiumflocken von 1:1 bis 6:1 verwendet wird, und der Glimmer und die Aluminiumflocken zusammen in einem Gewichtsverhältnis zu dem Fluorkohlenstoff-Polymer, dem Acryl-Copolymer und dem Härter von 0,05 bis 0,4 verwendet werden; worin ein Mattierungsmittel, um den Glanz bis in den Bereich von 10 bis 20% Reflektanz (gemessen in einem 60°-Glanzmeßgerät) zu reduzieren, und ein Wachs, um eine Oberflächenschmierung zu erzeugen, die die Kratzfestigkeit erhöht, vorhanden sind.

8. Überzugsmasse nach Anspruch 7, worin das zusätzliche Pigment in einer Menge verwendet wird, um dem Überzug einen tiefen Farbton zu geben, ohne daß die Opazität zu groß wird, um die Weiße und das metallische Aussehen, die durch den Glimmer bedingt sind, zu verbergen.

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Revendications

1. Composition de revêtement en solution à solvant thermodurcissable, qui durcit en procurant l'apparence d'aluminium anodisé, comprenant une dispersion d'un polymère fluorocarboné dans un solvant organique volatil, ladite dispersion étant pigmentée avec un mica finement divisé et des paillettes d'aluminium pour fournir une combinaison de blancheur et de transparence procurant une apparence d'aluminium anodisé, ladite dispersion pigmentée contenant une combinaison d'un copolymère acrylique, soluble dans le solvant, à fonctionnalité hydroxy, thermodurcissable, de monomères à insaturation monoéthylénique contenant de 3% à 35% de monomère monoéthylénique à fonctionnalité hydroxy et d'un agent de durcissement de celui-ci, la quantité du copolymère acrylique à fonctionnalité hydroxy étant de 5 à 50% en poids de l'ensemble des solides de la résine, et la quantité d'agent de durcissement étant de 3 à 30% en poids du copolymère acrylique à fonctionnalité hydroxy; pour procurer un thermodurcissement qui accroît la dureté et la résistance à l'abrasion du revêtement; et où ledit mica est utilisé dans un rapport en poids par rapport aux dites paillettes d'aluminium de 1:1 à 6:1 et ledit mica et les dites paillettes d'aluminium sont utilisés ensemble dans un rapport en poids par rapport aux dits polymère fluorocarboné, copolymère acrylique et agent de durcissement de 0,05 à 0,4; et suffisamment de pigment additionnel pour fournir une coloration suffisante pour permettre une maîtrise de la production sans conférer assez d'opacité pour masquer la blancheur et l'apparence métallique procurées par la combinaison du mica et des paillettes d'aluminium.

2. Composition de revêtement selon la revendication 1, dans laquelle ledit mica est revêtu avec de 10% à 45% de dioxyde de titane par rapport au poids du mica revêtu et les plaquettes du dit mica ont leur plus grande dimension inférieure à 100 µm, lesdites paillettes d'aluminium sont résistantes aux acides et passent à travers un tamis de 100 mesh (0,15 mm), un agent de matité est présent pour réduire l'éclat dans l'intervalle de 10-20% de pouvoir réflecteur mesuré sur un appareil de mesure de brillance à 60°, et une cire est ajoutée pour procurer une onctuosité de surface qui favorise la résistance aux endommagements.

3. Composition de revêtement selon la revendication 1, dans laquelle ledit polymère fluorocarboné est fourni par des particules finement divisées d'homopolymère de poly(fluorure de vinylidène).

4. Composition de revêtement selon la revendication 1, dans laquelle ledit copolymère à fonctionnalité hydroxy consiste en des monomères acryliques, ledit monomère hydroxylé est un acrylate ou méthacrylate d'hydroxyalkyle contenant de 2 à 4 atomes de carbone dans le groupe alkyle en une quantité de 5% à 15% et ledit copolymère est présent en une quantité de 20% à 45% de l'ensemble des solides de la résine et comprend au moins 50% de méthacrylate de méthyle.

5. Composition de revêtement selon la revendication 1, dans laquelle ledit polymère fluorocarboné est fourni par des particules finement divisées d'homopolymère de poly(fluorure de vinylidène) présent en une quantité d'au moins environ 47% de l'ensemble des solides de la résine, et ledit agent de durcissement est une résine aminoplaste.

6. Composition de revêtement selon la revendication 5, dans laquelle ladite résine aminoplaste est une résine de poly(alcoxyméthyl mélamine) contenant de 1 à 4 atomes de carbone dans le groupe alcoxy et présente en une quantité de 3% à 30% du dit copolymère à fonctionnalité hydroxy.

7. Composition de revêtement selon la revendication 1, dans laquelle ledit polymère fluorocarboné est fourni par une dispersion d'un poly(fluorure de vinylidène) dans un solvant organique volatil, ledit poly(fluorure de vinylidène) étant présent en une quantité d'au moins environ 47% de l'ensemble des solides de la résine, ladite dispersion étant pigmentée avec un mica finement divisé revêtu avec 10% à 45% de dioxyde de titane par rapport au poids du mica revêtu, les plaquettes du dit mica ont leur plus grande dimension inférieure à 100 µm, et des paillettes d'aluminium pour procurer une combinaison de blancheur et de transparence procurant une apparence d'aluminium anodisé, lesdites paillettes d'aluminium étant résistantes aux acides et passant à travers un tamis de 100 mesh (0,15 mm), ladite dispersion pigmentée contenant un copolymère acrylique à fonctionnalité hydroxy et un agent aminoplaste pour le durcissement de celui-ci, ledit mica étant utilisé dans un rapport en poids par rapport aux dites paillettes d'aluminium de 1:1 à 6:1 et ledit mica et lesdites paillettes d'aluminium étant utilisés ensemble dans un rapport

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en poids par rapport aux dits polymère de poly(fluorure de vinylidène), copolymère acrylique et agent durcissant aminoplaste de 0,05 à 0,4, un agent de matité pour réduire l'éclat dans l'intervalle de 10-20% de pouvoir réflecteur mesuré sur un appareil de mesure de brillance à 60°, et une cire procurant une onctuosité de surface qui favorise la résistance aux endommagements.

8. Composition de revêtement selon la revendication 7, dans laquelle ledit pigment additionnel est utilisé en une quantité suffisante pour teinter le revêtement pour procurer une coloration foncée sans conférer assez d'opacité pour masquer l'apparence métallique transparente procurée par ledit mica.