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(54) Title: MATERIAL IN THE FORM OF A SHEET, A FOIL OR A STRIP HAVING A HYDROPHILIC SURFACE SEALING, METHOD FOR PRODUCING IT AND ITS USE			
(57) Abstract A material having a hydrophilic surface sealing and a method for producing it are provided, the surface sealing being produced by a solution which contains polyvinyl phosphonic acid and hydrofluoric acid. The advantages of the invention are improved properties in use and a simple production.			

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Material in the form of a sheet, a foil or a strip having a hydrophilic surface sealing, method for producing it and its use

The invention relates to a material having a hydrophilic surface sealing, and to a method for producing it.

Such a material can be used as support for a radiation-sensitive layer of an offset printing plate.

In the radiation-sensitive layer a printing image is photomechanically copied, image-free locations on the support being formed by removing the corresponding areas of the radiation-sensitive layer. Simultaneously, the image-free locations form the background of the image. With regard to the printing process, it must be guaranteed that the image locations are hydrophobic and colour-absorbing and the image-free locations are hydrophilic and thus repel the oily or oleophilic printing colours. In addition, the support must ensure a good adhesion of the radio-sensitive layer in the image areas.

Therefore, the prior art suggests an additional coating, the so-called sealing, between the support and the radio-sensitive layer for improving the adhesion of the latter and preventing staining of the support.

Known methods are for instance the sealing with silicate, with condensed aryl sulfonic acid (DE-A-32 17 870), with polyvinyl phosphonic acid (PVPA) (DE-A-16 21 478) or with an aqueous mixture of a hydrolysate or a condensate of a silane

and a fluoride of an alkali metal or of the metals Ti, Zr or Si (DE-A-39 28 794).

EP-A-0 089 510 discloses a support material of aluminum or an alloy thereof which is covered with a hydrophilic sealing layer which is produced *inter alia* by using polyvinyl phosphonic acid with admixtures of silicates, borates and fluoroborates. These admixtures improve the adhesion of the image, the shelf-life of the radiation-sensitive layer, the hydrophilic action and the resistance to SnCl_2 .

The problem underlying the invention is to provide a support material having a hydrophilic surface sealing and a method for producing it by means of which the support characteristics are further improved and a universally usable sealing is achieved which has advantages for positively, negatively as well as for instance electrophotographically working printing plates.

This problem is solved with the features of the claims.

The solution according to the invention is based on the idea to mix polyvinyl phosphonic acid with hydrofluoric acid as an agent which etches the support surface, and to use this as sealing solution.

It has been found that the invention makes it possible to develop also strongly tinted coatings with weak positive developers in a staining-free manner. The amount of hydrophilizing PVPA may be increased without impairing the adhesion of the coating and thus the pressure stability. The sealing solution according to the invention allows the sealing of mechanically and electrolytically roughened surfaces as well as of surfaces which are galvanically plated with chromium.

In the following, the invention is explained in detail by means of Examples.

Example 1

An electrolytically grained aluminum substrate was anodized in sulfuric acid to 4 g/m² oxide. After repeated rinsing with deionized water the plate was dipped in the following sealing solution: 0.5 g/l PVPA and 0.3 g/l HF (100 %), at a temperature of the bath of 50°C for 10 seconds. This was followed by a rinse of tap water, squeegee and drying at 100°C for 1 min.

The resulting sealed basis was coated with the following positive solution (indicated in parts by weight):

7	parts by weight CF-novolak
2	parts by weight 2,1-naphthoquinone diazole -4-sulfonic acid ester of a CF novolak
0.11	parts by weight crystal violet
0.05	parts by weight triazine B
30	parts by weight isobutyl acetate
30	parts by weight methylisobutyl acetate
20	parts by weight methyl ethyl ketone
9	parts by weight ethyl glycol

No blue staining was visible after development with Polychrome 2000 KH (1+5) - 1 l KH 2000 contains 66 g sodium silicate, 9 g NaOH, 12 g KOH and 913 g water. During printing, the plate showed a good free-wheel behaviour even after a long machine standstill. A high edition was achieved before the plate showed wear. A baked plate also showed the same good printing characteristics.

Example 2 (negative plate)

A basis sealed as in Example 1 was coated with the following solution (indicated in parts by weight):

8	parts by weight diazonium polycondensate
20	parts by weight oligomeric urethane acrylate (UR 3447)
50	parts by weight tetrapolymeric acrylate (ACR 507)
10	parts by weight Estane
4	parts by weight Victoria blue
1	part by weight methyl orange-Na-salt
0.2	parts by weight phosphoric acid (85 %)
75	parts by weight methyl Cellosolve
20	parts by weight methanol

A coating weight of 0.7 g/m² was obtained. After development with 988 B - 1 1 988 B contains 10 g diethanol amine, 10 g sodium octyl sulfate and 980 g water - , a shorter exposure time was found compared to a basis which was only sealed with PVPA. During printing, wear appeared considerably later than with the comparative plate which had been exposed to the same solid layer.

For comparison, the aluminum support of Example 1 was treated with a conventional coating solution.

Comparative Example

(to Example 1)

Only 0.5 g/l PVPA was used instead of an aqueous PVPA/HF solution. The resulting sealed basis was coated with the solution from Example 1.

After development with a positive developer (for instance Polychrome 2000 KH, 1 part concentrate and 5 parts of water), a blue staining became visible.

The Examples prove the clear advantages of the support material having a hydrophilic surface coating according to the invention in the use of offset printing plates.

Claims

1. A material in the form of a sheet, a foil or a strip having a hydrophilic surface sealing which can be produced by a sealing solution containing polyvinyl phosphonic acid (PVPA) in a concentration ranging from 0.01 to 10 g/l and hydrofluoric acid (HF) in a concentration ranging from 0.005 to 5 g/l.
2. The material according to claim 1, characterized in that the material consists of aluminum or an alloy thereof or that it is chromium-plated.
3. The material according to claim 1 or 2, characterized in that the material was anodically oxidized prior to the surface sealing.
4. The material according to any one of claims 1 to 3, characterized in that the sealing solution is an aqueous solution which contains other acids or anions in addition to PVPA and HF.
5. A method for the hydrophilic sealing of a material in the form of a sheet, a foil or a strip using a sealing solution according to claim 1, wherein the sealing solution is applied by spraying or by a dipping process at a temperature ranging from 5 to 90°C.
6. The method according to claim 5, wherein an aqueous rinse is provided after the application of the sealing.
7. The method according to any one of claims 5 to 6, characterized in that the material consists of aluminum or an alloy thereof or is chromium-plated.

8. The use of the material according to any one of claims 1 to 4 as substrate material in the production of an offset printing plate which carries a radiation-sensitive coating.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 93/00235

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)⁶

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 C09D143/02; C23C22/34; B41N3/03

II. FIELDS SEARCHED

Minimum Documentation Searched⁷

Classification System	Classification Symbols
Int.Cl. 5	C09D ; C23C ; C08K

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched⁸III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹

Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	DE,A,1 621 478 (KALLE AG) 29 April 1971 cited in the application see claim 1 -----	1

⁹ Special categories of cited documents :¹⁰

- ^{"A"} document defining the general state of the art which is not considered to be of particular relevance
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IV. CERTIFICATION

Date of the Actual Completion of the International Search 13 MAY 1993	Date of Mailing of this International Search Report 28.05.93
International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer Dieter Schüller

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.

EP 9300235
SA 70452

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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