

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 15 April 2010**

Case Number: T 1735/07 - 3.4.02

Application Number: 00906003.9

Publication Number: 1163543

IPC: G02B 5/20

Language of the proceedings: EN

Title of invention:

Adhesion layer for metal oxide UV filters

Applicant:

SABIC Innovative Plastics IP B.V.

Opponent:

-

Headword:

-

Relevant legal provisions:

-

Relevant legal provisions (EPC 1973):

EPC Art. 56

Keyword:

"Inventive step (yes - after amendment)"

Decisions cited:

-

Catchword:

-



Case Number: T 1735/07 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 15 April 2010

Appellant: SABIC Innovative Plastics IP B.V.
Plasticslaan 1
NL-4612 PX Bergen op Zoom (NL)

Representative: Strehlke, Ingo Kurt
Gesthuysen, von Rohr & Eggert
Postfach 10 13 54
D-45013 Essen (DE)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 14 May 2007
refusing European application No. 00906003.9
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: A. G. Klein
Members: F. J. Narganes-Quijano
B. Müller

Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 00906003.9 based on the International application No. PCT/US00/03124 (International publication No. WO 00/55655).

During the first-instance proceedings reference was made, among others, to the following documents

D1: US-A-5763063

D7: WO-A-9713802,

and in its decision the examining division held that the subject-matter of claim 1 then on file did not involve an inventive step with regard to the disclosure of document D1 (Article 56 EPC 1973). The examining division also expressed doubts as to whether claim 1 then on file was clear (Article 84 EPC 1973) in respect of the feature "the adhesion strength between the metal oxide layer and the substrate is 2.07 MPa or greater".

- II. With the statement setting out the grounds of appeal the appellant filed a number of sets of claims amended according to different requests and requested setting aside of the decision under appeal and the grant of a patent.
- III. In response to the preliminary opinion expressed by the Board in a communication annexed to a summons to oral proceedings, the appellant, with a letter dated 26.03.2010, filed a set of claims 1 to 17 amended according to a main request and two further sets of

claims amended according to auxiliary requests replacing the previous claim requests. With the same letter the appellant submitted amended description pages 1 to 30, 2a, 2b and 2c and a set of drawing sheets 1/10 to 10/10 replacing the corresponding application documents. The text on pages 2a and 2b was for insertion in the text of page 2 after the first paragraph, the text on page 2c was for insertion in the text of page 2 after the second paragraph, and the whole content of page 8 was deleted.

After consideration of the amendments made to the application documents according to the main request of the appellant, the Board cancelled the oral proceedings.

IV. Claim 1 and dependent claim 2 of the main request read as follows:

"1. A multilayer structure, comprising:

- a polymeric substrate (1) comprising a transparent polymeric material comprising polycarbonate, polyestercarbonate, polyethersulfone or polyetherimide;

- an adhesion promoting layer comprising a transparent metal layer (2) from 10 to 200 nm thick on the substrate, said metal layer being elected from the group consisting of silver, aluminum, iron, nickel, copper, tin and gold, said transparent metal layer (2) being obtainable by DC or RF magnetron sputtering or arc plasma deposition; and

- an UV absorption layer comprising a transparent metal oxide layer (3) having a thickness of from 400 to 600 nm and comprising at least one of ZnO, indium-doped

zinc oxide (i.e. IZO) and aluminum-doped zinc oxide (i.e. AZO) over the metal layer (2), said transparent metal oxide layer (3) being obtainable by reactive sputtering or arc plasma deposition,

wherein the metal oxide layer (3) is in direct contact with the metal layer (2) and

wherein the multilayer structure further comprises an interlayer (5) between the substrate (1) and the metal layer (2), the interlayer (5) comprising a plasma polymerized organosilicon material."

"2. The multilayer structure of claim 1, wherein the adhesion strength between the metal oxide layer and the substrate is 2.07 MPa or greater."

The main request further includes dependent claims 3 to 17 all referring back to claim 1.

The wording of the claims amended according to the auxiliary requests is not relevant to the present decision.

V. The arguments submitted by the appellant in support of its request can be summarized as follows:

The feature relating to the adhesion strength between the metal oxide layer and the substrate being 2.07 MPa or greater is clear since the feature represents a defined and quantified physical parameter directly pointing to the multilayer structure as such.

Claim 1 of the main request specifies an interlayer of a plasma polymerized organosilicon material. With respect to the advantages of this specific interlayer,

reference is made to page 12, second paragraph of the description of the application according to which the interlayer relieves stress between the substrate and the overlayers. Stress may occur, for example, due to differences in thermal expansion, ductility and elasticity between the substrate and the overlayers. Accordingly, the durability of the inventive multilayer structure is further improved.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request - Amendments and clarity*

The application documents amended according to the main request of the appellant satisfy the formal requirements of the EPC, and in particular those set forth in Article 123(2) EPC 1973. More particularly, claim 1 is based on claims 1, 4 to 6, 10, 11 and 17, together with the passages on page 6, lines 1 to 3, page 10, lines 3 to 18 and page 13, lines 2 to 10 of the application as published, and dependent claims 2 to 17 are based on claims 3, 7 to 10, 15 to 19, 21, 23 and 55 to 57 as published, together with the corresponding description (see in particular page 6, second paragraph, page 9, third paragraph, paragraph bridging pages 9 and 10, page 11, second paragraph, and page 12, first and third paragraphs).

In its decision the examining division expressed doubts as to the clarity of the feature "the adhesion strength between the metal oxide layer and the substrate is 2.07

MPa or greater" defined in claim 1 on which the decision under appeal was based (point I above). In the application documents amended according to the present main request this feature has been shifted to dependent claim 2 (see point IV above) and in the Board's view the feature is sufficiently clear in its context. Thus, claim 2 refers to claim 1, and this claim already defines the features (composition, thickness and deposition method of both the metal oxide and the metal layers) required to achieve the value of the adhesion strength defined in claim 2. Moreover, the adhesion strength is a common parameter in the field of multilayered structures, and the description discloses several examples illustrating how multilayer structures as claimed are obtained with values of the adhesion strength above, and even substantially greater than 2.07 MPa (see examples 1, 3, 4 and 6 to 9 of the invention shown in the Table on page 28 of the application). In view of these considerations, the Board is satisfied that the claimed invention is clear within the meaning of Article 84 EPC 1973.

The description has been revised and brought into line with the invention as now claimed (Article 84 EPC 1973, second sentence, and Rules 27(1)(b) and (c) EPC 1973).

3. *Main request - Novelty and inventive step*

3.1 *Novelty*

Document D1 discloses a multilayer structure (Figure 1 and column 5, lines 53 to 64) comprising a transparent substrate 12 of a polymeric material comprising polycarbonate (column 5, lines 5 to 28 and 53 to 56), a

transparent metal layer 14 of silver and/or copper (column 5, lines 57 and 58 together with column 4, lines 39 to 44) and a transparent dielectric layer 16 comprising ZnO or indium zinc oxide (column 5, lines 58 and 59 together with column 3, lines 32 to 60) deposited directly on the metal layer, the metal and the dielectric layers being both deposited using magnetron sputtering techniques (column 6, line 43 *et seq.*). In addition, the metal layer operates functionally, at least to some extent, as an adhesion promoting layer for adhering the dielectric layer to the substrate.

While in document D1 the metal layer is deposited directly on the substrate, claim 1 of the main request requires an interlayer of a plasma polymerized organosilicon material between the substrate and the metal layer. Thus, already for this reason the subject-matter of claim 1 is novel over the disclosure of document D1.

The remaining documents on file are less relevant. In particular, none of them discloses a multilayer structure comprising a metal layer applied on a substrate and further including an interlayer of a plasma polymerized organosilicon material between the substrate and the metal layer. More particularly, document D7 discloses a plastic substrate coated with a protective layer and comprising an adhesion promoting interlayer between the substrate and the protective layer, both the protective layer and the adhesion promoting interlayer comprising a plasma polymerized organosilicon material (see abstract); the document,

however, is silent as to the provision of metal and/or metal oxide layers.

Therefore, the subject-matter of claim 1 is novel over the prior art presently on file.

3.2 *Inventive step*

The Board concurs with the examining division in considering document D1 as representing the closest state of the art. As concluded in point 3.1 above, the subject-matter of claim 1 differs from the multilayer structure disclosed in document D1 at least in the provision of an interlayer of a plasma polymerized organosilicon material between the substrate and the metal layer.

According to the disclosure of the invention (page 12, second paragraph of the application) and the submissions of the appellant (point V above), the technical effect achieved by the distinguishing feature identified above is relieving stress between the substrate and the overlying layers caused by the different physical properties (elasticity, ductility and thermal expansion) of the respective materials of the substrate and the overlying layers.

None of the documents on file discloses or suggests the provision in a multilayer structure of an interlayer having the claimed characteristics in order to relieve stress between the substrate and the layers overlying the substrate and, therefore, to improve the durability of the multilayer structure. In particular, document D7 discloses the use of plasma polymerized organosilicon

materials in multilayer structures (see point 3.1 above, penultimate paragraph), but only as an adhesion promoting interlayer (page 1, lines 26 to 29) or as a protective coating (page 1, lines 3 to 5 and 30 to 33, and page 3, lines 30 and 31), and the document contains no disclosure of the stress-relieving properties of an interlayer of a plasma polymerized organosilicon material at the metal/substrate interface of a multilayer structure as claimed.

In view of the above considerations, the Board concludes that the subject-matter of claim 1 is not rendered obvious by the prior art presently on file (Article 56 EPC 1973).

- 3.3 The Board concludes that the subject-matter of claim 1 of the main request, as well as that of dependent claims 2 to 17 appendant thereto, is novel and involves an inventive step over the available prior art (Article 52(1) EPC).
4. The Board is also satisfied that the application documents amended according to the present main request and the invention to which they relate meet the remaining requirements of the EPC within the meaning of Article 97(1) EPC. The Board therefore concludes that the decision under appeal is to be set aside and a patent be granted on the basis of the application documents amended according to the present main request of the appellant.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent in the following version:
 - claims 1 to 17 of the main request filed with the letter dated 26.03.2010,
 - description pages 1 to 7, 9 to 30, 2a, 2b, and 2c filed with the letter dated 26.03.2010, wherein the text on pages 2a and 2b is inserted in the text of page 2 after the first paragraph, the text on page 2c is inserted in the text of page 2 after the second paragraph, and the text on page 7 is followed by the text on page 9, and
 - drawing sheets 1/10 to 10/10 filed with the letter dated 26.03.2010.

The Registrar:

The Chairman:

M. Kiehl

A. G. Klein