

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KIM J. BLACKWELL, PEI C. CHEN,
ALLAN R. KNOLL, LUIS J. MATIENZO and RICHARD D. WEALE

Appeal No. 1997-3314
Application 08/266,783

ON BRIEF

Before WARREN, OWENS and DELMENDO, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of claims 1-4 and 6-13, which are all of the claims remaining in the application.

THE INVENTION

Appellants' claimed invention is directed toward a

process for coating a layer of chromium and then a layer of copper onto a specified polyimide substrate. Appellants state that the process is especially applicable for making metallized integrated circuit substrates (specification, page 1, lines 12-13). Claim 1 is illustrative:

1. A process for providing a metallic layer on a polyimide substrate which comprises providing a substrate of a polyimide from diaryl dianhydride and a diamine; sputter coating a layer of chromium of 200 angstroms or less on said substrate at a deposition rate of about 4 angstroms/second or less, and wherein the temperature of said polyimide substrate during the sputtering is about 60EC or less and resulting in improved adhesion, followed by coating a layer of copper on said layer of chromium.

THE REFERENCES

Belke, Jr. et al. (Belke) 1984	4,466,874	Aug. 21,
Ho et al. (Ho) 1988	4,720,401	Jan. 19,
Sallo 1989	4,863,808	Sep. 5,
Clabes et al. (Clabes) 1989	4,886,681	Dec. 12,

Handbook of Adhesives 597-99 & 612-13 (Irving Skeist, ed., Van Nostrand Reinhold 1977) (Skeist).

THE REJECTION

Claims 1-4 and 6-13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Sallo in view of Skeist and Ho,

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Clabes or Belke.

OPINION

We affirm the rejection of claims 1-4 and 6-12, and reverse the rejection of claim 13.

Appellants state that the claims are grouped as follows: 1) claims 1-4, 6-10 and 12, 2) claim 11, and 3) claim 13 (brief, page 3). We therefore limit our discussion to claims 11 and 13 and one claim from the other group, i.e., claim 1. See *In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(7)(1995).

Claim 1

Sallo discloses a process for making flexible electric circuitry by sputter coating a layer of chromium onto a polyimide substrate and coating a layer of copper on the chromium layer (col. 1, lines 1-12; col. 2, lines 53-58; col. 3, lines 59-60). The chromium layer preferably has a thickness of from 50 to 500D, and a thickness of 50D is exemplified (col. 3, lines 62-66; col. 4, lines 51-52). The polyimide is a polyimide "such as" Kapton® (col. 3, lines 48-50). In our opinion, this indication that other polyimides

are suitable would have fairly suggested, to one of ordinary skill in the art, use of commercially available polyimides generally such as UPILEX S[®] which, appellants acknowledge, was commercially available and is made from a diaryl dianhydride and a diamine (specification, page 2, lines 24-31).¹

Sallo does not disclose the chromium sputtering deposition rate or temperature. However, Clabes discloses a method, in the electronics field, for applying a layer of a metal which can be copper or chromium onto a substrate which can be a polyimide substrate, by altering the surface chemistry of the substrate using low energy irradiation and depositing the metal by sputtering or evaporation (col. 1, lines 21-26; col. 4, lines 11-14 and 42-45; col. 6, lines 11-13, 17 and 38-42). In one embodiment the low energy irradiation and metal deposition take place simultaneously and the metal deposition rate is 1-100 D/sec (col. 5, lines 48-63). Clabes teaches that the

¹It is axiomatic that our consideration of the prior art must, of necessity, include consideration of the admitted prior art. See *In re Hedges*, 783 F.2d 1038, 1039-40, 228 USPQ 685, 686 (Fed. Cir. 1986); *In re Davis*, 305 F.2d 501, 503, 134 USPQ 256, 258 (CCPA 1962).

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irradiation can occur at room temperature or at elevated substrate temperatures (col. 5, lines 18-19) and, therefore, indicates that the simultaneous irradiation and metal deposition can take place at a temperature as low as room temperature.

In view of the above-discussed prior art, we conclude that the invention recited in appellants' claim 1 would have been *prima facie* obvious to one of ordinary skill in the art at the time of appellants' invention.

Appellants argue that Sallo's substrate naturally heats up during the sputtering of the chromium onto the substrate because sputtering is a high energy process (brief, page 4). This argument is not persuasive in view of the indication by Clabes, as discussed above, that the sputtering can take place at room temperature. The evidence of record does not indicate that the high energy of the chromium particles bombarding the substrate would cause the substrate temperature to increase from room temperature to more than appellants' upper temperature limit of about 60EC. Appellants have provided mere attorney argument to that effect, and such argument

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cannot take the place of evidence. See *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984); *In re Payne*, 606 F.2d 303, 315, 203 USPQ 245, 256 (CCPA 1979); *In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978); *In re Pearson*, 494 F.2d 1399, 1405, 181 USPQ 641, 646 (CCPA 1974).

Appellants argue that Clabes does not suggest that a substrate temperature of 60EC or less should be used when sputtering chromium onto polyimides (brief, page 6). Clabes does not specifically disclose this combination of temperature, metal and substrate. However, as discussed above, the reference would have fairly suggested this combination to one of ordinary skill in the art.

Appellants argue (brief, page 6) that Clabes teaches away from appellants' claimed invention by stating that the adhesion increased at low energy irradiation temperatures above room temperature (col. 8, lines 43-45). We are not convinced by this argument because Clabes does not teach that the process is inoperable at room temperature but, instead, teaches that there is a benefit to using higher temperatures.

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The reference would have fairly suggested operation at room temperature to one of ordinary skill in the art who did not require higher adhesion than that obtained at this temperature. Moreover, even if a temperature somewhat higher than room temperature were used in Clabes simultaneous irradiation/sputtering embodiment, the process would fall within the scope of appellants' claim 1 as long as the substrate temperature did not exceed about 60EC.

For the above reasons we conclude, based upon the preponderance of the evidence, that the process recited in appellants' claim 1 would have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103.

Claim 11

Claim 11 recites that the thickness of the chromium layer is about 5 to about 20D.

Appellants argue that Sallo requires a chromium thickness of at least 50D (brief, page 8). Sallo's chromium layer thickness range of 50-500D, however, is merely a preferred range (col. 3, lines 62-66). The teaching by Sallo that the function of the chromium layer is to improve the bonding

between the copper layer and the polyimide substrate (col. 2, lines 65-67) would have led one of ordinary skill in the art to also use chromium layer thicknesses inside or outside the preferred range, including thicknesses in the range of about 5 to about 20D, as needed to obtain suitable copper/polyimide adhesion.

Accordingly, we affirm the rejection of claim 11.

Claim 13

Appellants' claim 13 recites that the temperature of the polyimide substrate during the sputtering is about $0^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

The examiner argues that it would have been obvious to one of ordinary skill in the art to vary the sputtering temperature such that an optimum can be obtained to achieve maximum adhesion (answer, page 6). The examiner, however, does not explain why Clabes' teaching that the low energy irradiation can occur at room temperature or higher (col. 5, lines 18-19) would have indicated, to one of ordinary skill in the art, that temperatures as low as about 5°C would be suitable. Consequently, we conclude that the examiner has not established a *prima facie* case of obviousness of the process

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recited in appellants' claim 13.

DECISION

The rejection of claims 1-4 and 6-12 under 35 U.S.C. § 103 over Sallo in view of Skeist and Ho, Clabes or Belke, is affirmed. The rejection of claim 13 under 35 U.S.C. § 103 over these references is reversed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

CHARLES F. WARREN)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
TERRY J. OWENS))
Administrative Patent Judge)	APPEALS AND
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