[0048] [Table 1-1]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/C		
Comparative Example 1	Sodium chloride	1.30	Chloride ion	0.79	0.00080	0.0010	986	789	Peeling Presented	32
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0040								
	Cupric oxide	1.30								
	Surfynol 440 *2	0.0010								
Comparative Example 2	Sodium chloride	1.60	Chloride ion	0.97	0.00050	0.0010	1942	971	Peeling Presented	63
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.50								
	Surfynol 440 *2	0.0010								
Example 1	Sodium chloride	2.00	Chloride ion	1.21	0.00050	0.0010	2427	1214	No peeling	91
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0010								
Example 2	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	95
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 3	Sodium chloride	1.60	Chloride ion	0.97	0.00040	0.0015	2427	647	No peeling	85
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0020								
	Cupric oxide	1.30								
	Surfynol 440 *2	0.0015								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0049] [Table 1-2]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/C		
Example 4	Sodium chloride	3.30	Chloride ion	2.00	0.00040	0.0010	5006	2003	No peeling	92
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0020								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 5	Sodium chloride	4.00	Chloride ion	2.43	0.00030	0.0010	8091	2427	No peeling	91
	Sodium formate	5.00								
	Formic acid	9.00								
	H.C. polymer 2L *1	0.0015								
	Cupric oxide	4.00								
	Surfynol 440 *2	0.0010								
Example 6	Sodium chloride	2.94	Chloride ion	1.78	0.00020	0.0010	8921	1784	No peeling	90
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0010								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 7	Sodium chloride	0.70	Chloride ion	0.42	0.00014	0.0005	3034	850	No peeling	88
	Sodium formate	5.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0007								
	Cupric oxide	2.00								
	Surfynol 440 *2	0.0005								
Example 8	Sodium chloride	1.30	Chloride ion	0.79	0.00024	0.0010	3287	789	No peeling	85
	Sodium formate	5.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0012								
	Cupric oxide	2.00								
	Surfynol 440 *2	0.0010								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0050] [Table 1-3]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/C		
Comparative Example 3	Sodium chloride	3.50	Chloride ion	2.12	0.00020	0.0010	10620	2124	Peeling Presented	48
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0010								
	Cupric oxide	3.00								
	Surfynol 440 *2	0.0010								
Comparative Example 4	Sodium chloride	3.10	Chloride ion	1.88	0.00050	0.0002	3762	9406	No peeling	65
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0002								
Example 9	Sodium chloride	2.90	Chloride ion	1.76	0.00050	0.0002	3520	8799	No peeling	89
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0002								
Comparative Example 5	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0045	3641	405	No peeling	62
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0045								
Example 10	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0030	3641	607	No peeling	85
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0030								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000
*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0051] [Table 1-4]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/C		
Example 11	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	95
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.10								
	Surfynol 440 *2	0.0010								
Example 12	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	92
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 13	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	94
	Sodium acetate	6.00								
	Acetic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 14	Sodium bromide	2.50	Bromide ion	1.94	0.00050	0.0010	3880	1940	No peeling	90
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0053] [Table 1-6]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/C		
Comparative Example 7	Ammonium chloride	4.00	Chloride ion	2.65	0.00015	Not blended	17695	-	Peeling Presented	35
	Acetic acid	7.00								
	Epomin P-1000*3	0.0005								
	Cupric acetate monohydrate	5.50								
Comparative Example 8	Ammonium chloride	8.00	Chloride ion	5.31	0.00015	Not blended	35389	-	Peeling Presented	33
	Formic acid	2.00								
	Epomin P-1000*3	0.0005								
	Cupric formate tetrahydrate	7.00								
Comparative Example 9	Sodium chloride	4.00	Chloride ion	2.43	0.00015	Not blended	16182	-	Peeling Presented	38
	Acrylic acid	20.00								
	Epomin P-1000*3	0.0005								
	Cupric acetate monohydrate	5.50								
	Ethylene diamine	1.00								
Comparative Example 10	Acetic acid	5.00	Chloride ion	1.07	0.00015	Not blended	11105	-	Peeling Presented	33
	Epomin P-1000*3	0.0005								
	Cupric chloride dihydrate	4.00								
Comparative Example 11	Glycolic acid	10.00	Bromide ion	1.43	0.00015	Not blended	9542	-	Peeling Presented	48
	Epomin P-1000*3	0.0005								
	Cupric bromide	2.00								
Comparative Example 12	Acetic acid	6.00	Bromide ion	1.43	0.00010	Not blended	14605	-	Peeling Presented	30
	Epomin SP-200 *5	0.0001								
	Cupric bromide	2.00								

*3: manufactured by Nippon Shokubai Co., Ltd., 30 wt% aqueous solution of polyethyleneimine, weight average molecular weight of polymer: 70000
*5: manufactured by Nippon Shokubai Co., Ltd., 98 wt% aqueous solution of polyethyleneimine, weight average molecular weight of polymer: 10000

[0054] As shown in the results in Tables 1-1 to 1-6, Examples of the present invention were all rated "no peeling" in the tape peeling test even with a low etching amount of 0.1 μm. For the dot remaining ratio, examples of the present invention all showed a high value of 85% or more. On the other hand, comparative examples had poor results as compared to examples for at least one evaluation item. For the dot remaining ratio, comparative examples all showed a low value of 65% or less. These results show that according to the present invention, adhesion between copper and a resist can be uniformly maintained even with a low etching amount because the copper layer surface can be uniformly roughened.

[0055] When Examples and Comparative Examples are examined in more detail, it is apparent that by using a microetching solution with a value of A/B in a predetermined range, a uniform roughened shape can be provided over the entire copper layer surface from comparison of Example 1 (Fig. 1), Example 2 (Fig. 2) and Example 6 (Fig. 3) with Comparative Example 2 (Fig. 6) and Comparative Example 3 (Fig. 7). From comparison of Example 9 (Fig. 4) and Example 10 (Fig. 5) with Comparative Example 4 (Fig. 8) and Comparative Example 5 (Fig. 9), it is apparent that not only the value of A/B but also the value of A/D should be in a predetermined range.

[0056] From these results, it is considered that in the present invention, by ensuring that the concentration ratio of three components in a microetching solution, *i.e.* a halide ion (A), a polymer (B) and a nonionic surfactant (C), is in a predetermined range, a uniform roughened shape is formed on the surface of a copper layer, and consequently adhesion between the copper layer surface and a resin or the like can be uniformly maintained even with a low etching amount.

[0057] From comparison of the dot remaining ratios in Examples 15 and 16, it is apparent that roughening uniformity is improved by using a quaternary ammonium salt type polymer as a polymer in a microetching solution. From comparison of the dot remaining ratios in Examples 16 and 17, it is apparent that roughening uniformity is improved by using an acetylene glycol polyoxyethylene adduct as a nonionic surfactant in a microetching solution.

[0048] [Table 1-1]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/D		
Comparative Example 1	Sodium chloride	1.30	Chloride ion	0.79	0.00080	0.0010	986	789	Peeling Presented	32
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0040								
	Cupric oxide	1.30								
	Surfynol 440 *2	0.0010								
Comparative Example 2	Sodium chloride	1.60	Chloride ion	0.97	0.00050	0.0010	1942	971	Peeling Presented	63
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.50								
	Surfynol 440 *2	0.0010								
Example 1	Sodium chloride	2.00	Chloride ion	1.21	0.00050	0.0010	2427	1214	No peeling	91
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0010								
Example 2	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	95
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 3	Sodium chloride	1.60	Chloride ion	0.97	0.00040	0.0015	2427	647	No peeling	85
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0020								
	Cupric oxide	1.30								
	Surfynol 440 *2	0.0015								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0049] [Table 1-2]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/D		
Example 4	Sodium chloride	3.30	Chloride ion	2.00	0.00040	0.0010	5006	2003	No peeling	92
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0020								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 5	Sodium chloride	4.00	Chloride ion	2.43	0.00030	0.0010	8091	2427	No peeling	91
	Sodium formate	5.00								
	Formic acid	9.00								
	H.C. polymer 2L *1	0.0015								
	Cupric oxide	4.00								
	Surfynol 440 *2	0.0010								
Example 6	Sodium chloride	2.94	Chloride ion	1.78	0.00020	0.0010	8921	1784	No peeling	90
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0010								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 7	Sodium chloride	0.70	Chloride ion	0.42	0.00014	0.0005	3034	850	No peeling	88
	Sodium formate	5.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0007								
	Cupric oxide	2.00								
	Surfynol 440 *2	0.0005								
Example 8	Sodium chloride	1.30	Chloride ion	0.79	0.00024	0.0010	3287	789	No peeling	85
	Sodium formate	5.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0012								
	Cupric oxide	2.00								
	Surfynol 440 *2	0.0010								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0050] [Table 1-3]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/D		
Comparative Example 3	Sodium chloride	3.50	Chloride ion	2.12	0.00020	0.0010	10620	2124	Peeling Presented	48
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0010								
	Cupric oxide	3.00								
	Surfynol 440 *2	0.0010								
Comparative Example 4	Sodium chloride	3.10	Chloride ion	1.88	0.00050	0.0002	3762	9406	No peeling	65
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0002								
Example 9	Sodium chloride	2.90	Chloride ion	1.76	0.00050	0.0002	3520	8799	No peeling	89
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0002								
Comparative Example 5	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0045	3641	405	No peeling	62
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0045								
Example 10	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0030	3641	607	No peeling	85
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	1.80								
	Surfynol 440 *2	0.0030								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0051] [Table 1-4]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/D		
Example 11	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	95
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.10								
	Surfynol 440 *2	0.0010								
Example 12	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	92
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 13	Sodium chloride	3.00	Chloride ion	1.82	0.00050	0.0010	3641	1821	No peeling	94
	Sodium acetate	6.00								
	Acetic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								
Example 14	Sodium bromide	2.50	Bromide ion	1.94	0.00050	0.0010	3880	1940	No peeling	90
	Sodium formate	6.00								
	Formic acid	5.00								
	H.C. polymer 2L *1	0.0025								
	Cupric oxide	2.80								
	Surfynol 440 *2	0.0010								

*1: manufactured by Osaka Organic Chemical Industry Ltd., 20 wt% aqueous solution of quaternary ammonium salt-type polymer, weight average molecular weight of polymer: 200000

*2: manufactured by Nissin Chemical Industry Co., Ltd., nonionic surfactant (acetylene glycol polyoxyethylene adduct, HLB = 8, 100 wt % active constituent)

[0053] [Table 1-6]

	Blending components		Halide ion (A)		Polymer (B)	Nonionic surfactant (D)	Concentration ratio		Tape Peeling Test	Dot Remaining Ratio (%)
	Components	Concentration (% by weight)	Type	Concentration (% by weight)	Concentration (% by weight)	Concentration (% by weight)	A/B	A/D		
Comparative Example 7	Ammonium chloride	4.00	Chloride ion	2.65	0.00015	Not blended	17695	-	Peeling Presented	35
	Acetic acid	7.00								
	Epomin P-1000*3	0.0005								
	Cupric acetate monohydrate	5.50								
Comparative Example 8	Ammonium chloride	8.00	Chloride ion	5.31	0.00015	Not blended	35389	-	Peeling Presented	33
	Formic acid	2.00								
	Epomin P-1000*3	0.0005								
	Cupric formate tetrahydrate	7.00								
Comparative Example 9	Sodium chloride	4.00	Chloride ion	2.43	0.00015	Not blended	16182	-	Peeling Presented	38
	Acrylic acid	20.00								
	Epomin P-1000*3	0.0005								
	Cupric acetate monohydrate	5.50								
	Ethylene diamine	1.00								
Comparative Example 10	Acetic acid	5.00	Chloride ion	1.67	0.00015	Not blended	11105	-	Peeling Presented	33
	Epomin P-1000*3	0.0005								
	Cupric chloride dihydrate	4.00								
Comparative Example 11	Glycolic acid	10.00	Bromide ion	1.43	0.00015	Not blended	9542	-	Peeling Presented	48
	Epomin P-1000*3	0.0005								
	Cupric bromide	2.00								
Comparative Example 12	Acetic acid	6.00	Bromide ion	1.43	0.00010	Not blended	14605	-	Peeling Presented	30
	Epomin SP-200 *5	0.0001								
	Cupric bromide	2.00								

*3: manufactured by Nippon Shokubai Co., Ltd., 30 wt% aqueous solution of polyethyleneimine, weight average molecular weight of polymer: 70000
*5: manufactured by Nippon Shokubai Co., Ltd., 98 wt% aqueous solution of polyethyleneimine, weight average molecular weight of polymer: 10000

[0054] As shown in the results in Tables 1-1 to 1-6, Examples of the present invention were all rated "no peeling" in the tape peeling test even with a low etching amount of 0.1 μm. For the dot remaining ratio, examples of the present invention all showed a high value of 85% or more. On the other hand, comparative examples had poor results as compared to examples for at least one evaluation item. For the dot remaining ratio, comparative examples all showed a low value of 65% or less. These results show that according to the present invention, adhesion between copper and a resist can be uniformly maintained even with a low etching amount because the copper layer surface can be uniformly roughened.

[0055] When Examples and Comparative Examples are examined in more detail, it is apparent that by using a microetching solution with a value of A/B in a predetermined range, a uniform roughened shape can be provided over the entire copper layer surface from comparison of Example 1 (Fig. 1), Example 2 (Fig. 2) and Example 6 (Fig. 3) with Comparative Example 2 (Fig. 6) and Comparative Example 3 (Fig. 7). From comparison of Example 9 (Fig. 4) and Example 10 (Fig. 5) with Comparative Example 4 (Fig. 8) and Comparative Example 5 (Fig. 9), it is apparent that not only the value of A/B but also the value of A/D should be in a predetermined range.

[0056] From these results, it is considered that in the present invention, by ensuring that the concentration ratio of three components in a microetching solution, *i.e.* a halide ion (A), a polymer (B) and a nonionic surfactant (D), is in a predetermined range, a uniform roughened shape is formed on the surface of a copper layer, and consequently adhesion between the copper layer surface and a resin or the like can be uniformly maintained even with a low etching amount.

[0057] From comparison of the dot remaining ratios in Examples 15 and 16, it is apparent that roughening uniformity is improved by using a quaternary ammonium salt type polymer as a polymer in a microetching solution. From comparison of the dot remaining ratios in Examples 16 and 17, it is apparent that roughening uniformity is improved by using an acetylene glycol polyoxyethylene adduct as a nonionic surfactant in a microetching solution.