

# Electro Deposition on PCB Process

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# ELECTRO-DEPOSITION ON PCB PROCESS

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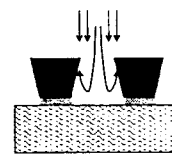
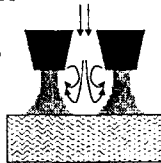
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## Trend of Fine Pattern technology ?

### Advantages of Thin Photo Resist

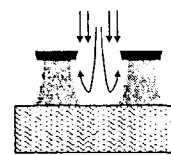
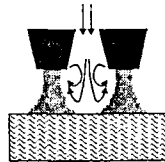
1st issue, Thin Copper foil (Half Etching)

36  $\mu\text{m}$   $\rightarrow$  18  $\mu\text{m}$   $\rightarrow$  12  $\mu\text{m}$   $\rightarrow$  9  $\mu\text{m}$   $\rightarrow$  5  $\mu\text{m}$



2nd issues, Thin Photo Resist

Dry Film  $\rightarrow$  LPR(Liquid Photo Resist)  $\rightarrow$  ED(Electro Deposit)  $\rightarrow$  LDI(Laser Direct Image)  
 30~40  $\mu\text{m}$   $\rightarrow$  12~18  $\mu\text{m}$   $\rightarrow$  12~20  $\mu\text{m}$   $\rightarrow$  4~8  $\mu\text{m}$  w/o Artwork Film  
 Negative Negative Negative  $\rightarrow$  Positive Negative



Dry Film

Electro-Deposition

3rd issues, High etching factor(Etching Chemical)

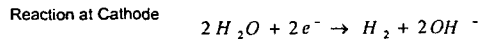
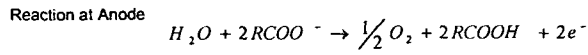
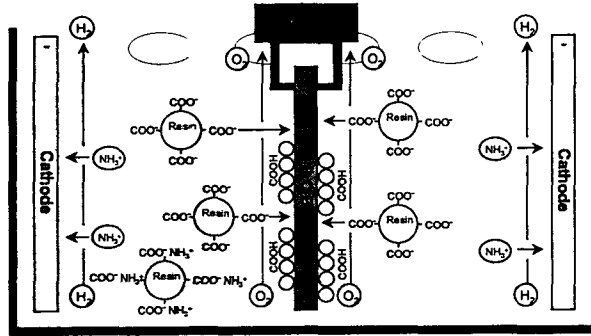
- Etching시 side-wall의 식각도 우수
- high Specific gravity( $\text{Fe}_2\text{Cl}_3$ ,  $\text{NaClO}_3$  +  $\text{CuCl}_2$ , etc)

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### Electro-Deposition 란?

Resist particle 표면이 -로 하전된 Resist 입자가 Board에 + 전류가 흐를 때 전기적으로 흡착되는 공법.



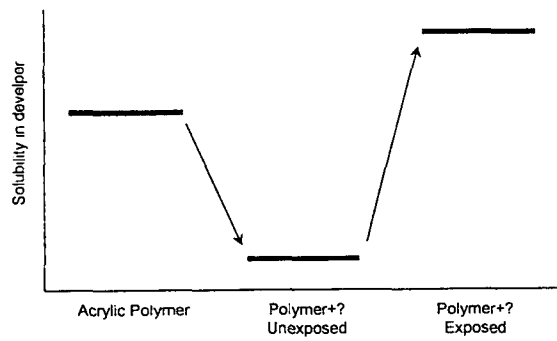
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### Exposure Mechanism

Photo Reaction Compound를 사용된 Photo inhibitor가 UV Light에 의해 현상액에서 chemical reaction에 의해 soluble한 상태로 전환됨.

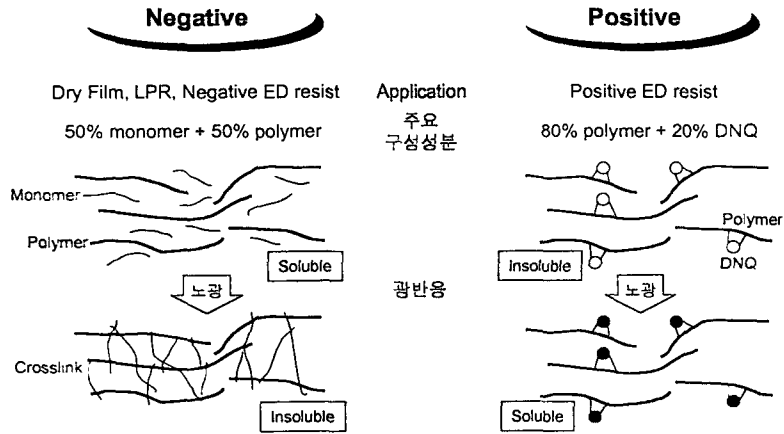
• Positive resist solubility



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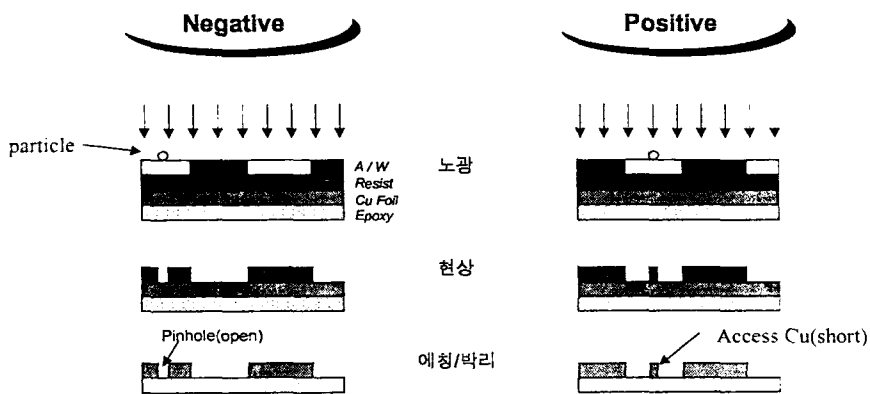
**Negative vs. Positive Photoresist**



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**Negative vs. Positive Photoresist**



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Dry Film vs. ED

• Production of high density design



Dry Film

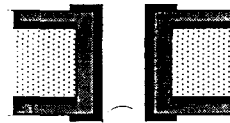


Electro-Deposition

• Three-dimensional capabilities



Dry Film



Electro-Deposition

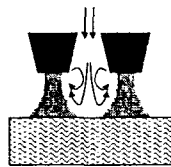
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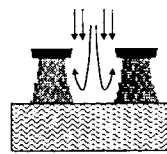
Dry Film vs. ED

Advantages of ED Resist

• Etching시 side-wall의 식각도 우수



Dry Film



Electro-Deposition

• Etching speed 향상 (25%이상)

• Reduced waste

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### Negative vs. Positive Photoresist

#### Negative

현상 시 유기용제가 노광부에도 스며 들어가 Swelling현상 발생

분해능이 좋지 않음

노광 전 Soft and tacky (취급이 어려움)

Opens rather than shorts

High A/R ratio PTH에 불리 (For negative ED)

가격이 저렴함

노광 시간이 짧음

#### Positive

No Swelling

Fine Pattern 형성에 유리

Hard and no tacky

Shorts rather than opens (핀홀 방지)

High A/R ratio PTH에 유리

상대적으로 비쌘

노광 시간이 김

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### Dry Film vs. ED

Type of resist	Dry Film	ED Resist
Resist type	Negative	Positive
Film thickness ( $\mu\text{m}$ )	30 - 40	4 - 8
Exposure dose ( $\text{mJ}/\text{cm}^2$ )	50 - 80	300-800
Resolution ( $\mu\text{m}$ )	75	25
Hole formation	Difficult to form fine pitch T/H	Easy to form land- ess. High Aspect ratio T/H
Adhesion to substrate	Poor	Good
Handling	Good	Fare
Resistance for particle	Poor	Good

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