



# \*The Life and Times of a Cell Phone

Photolithography

July 20, 2015

# The Life and Times of a Cell Phone Photolithography....

Photolithography allows us to make patterns on electronic substrates (like printed circuit boards and silicon) that:

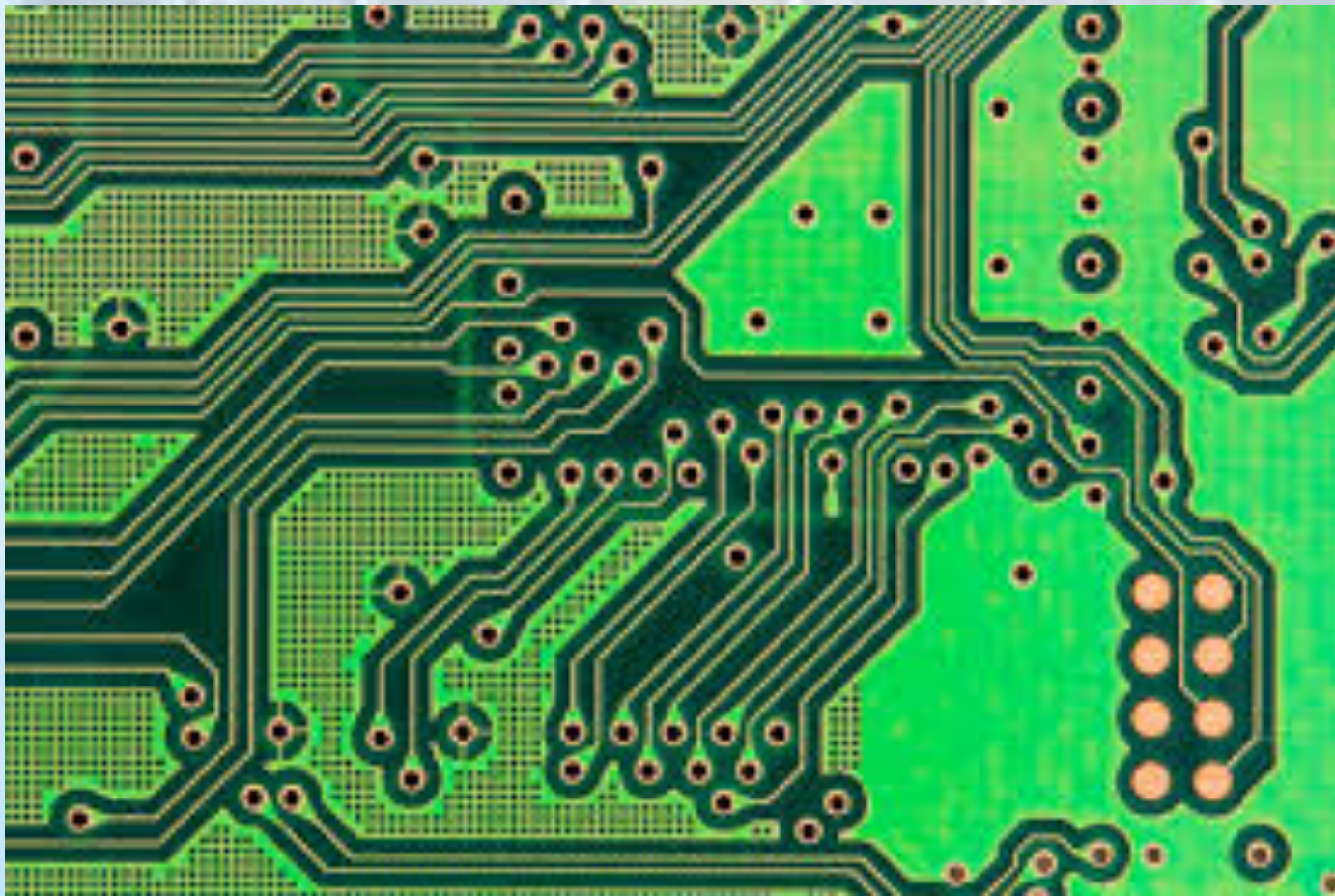
- \* Define the geometry of devices
- \* Connect electrical signals together.

Photolithography is a lot like old fashioned (analog) processes of developing photographs, except the process is binary – either the film is exposed or not exposed – there are no shades of gray.



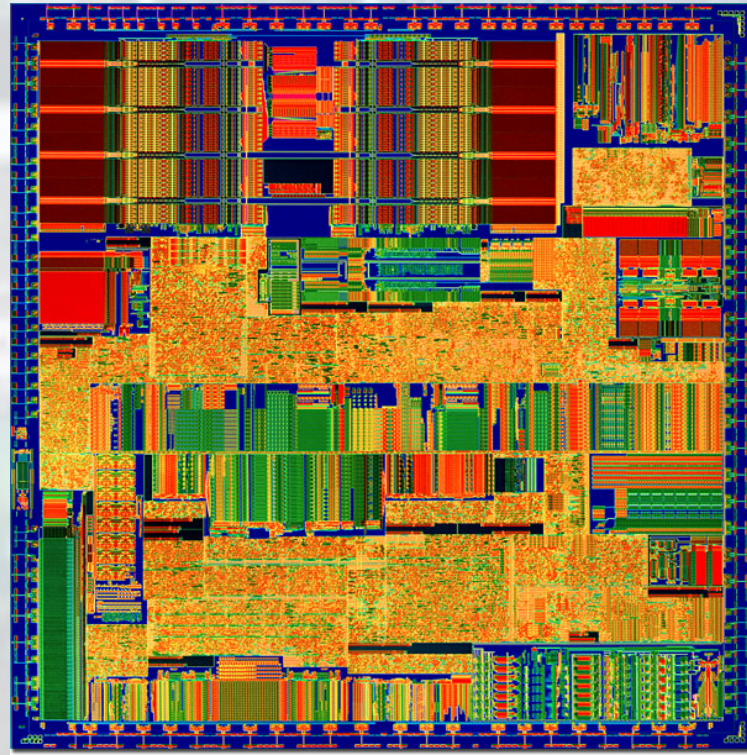
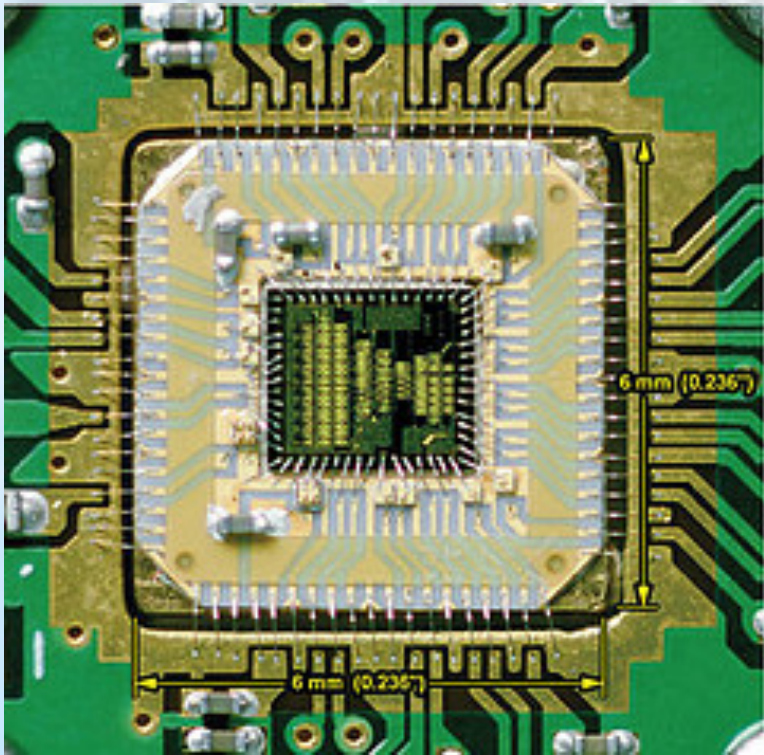
# The Life and Times of a Cell Phone Photolithography...on a PCB

PCB = Printed Circuit Board



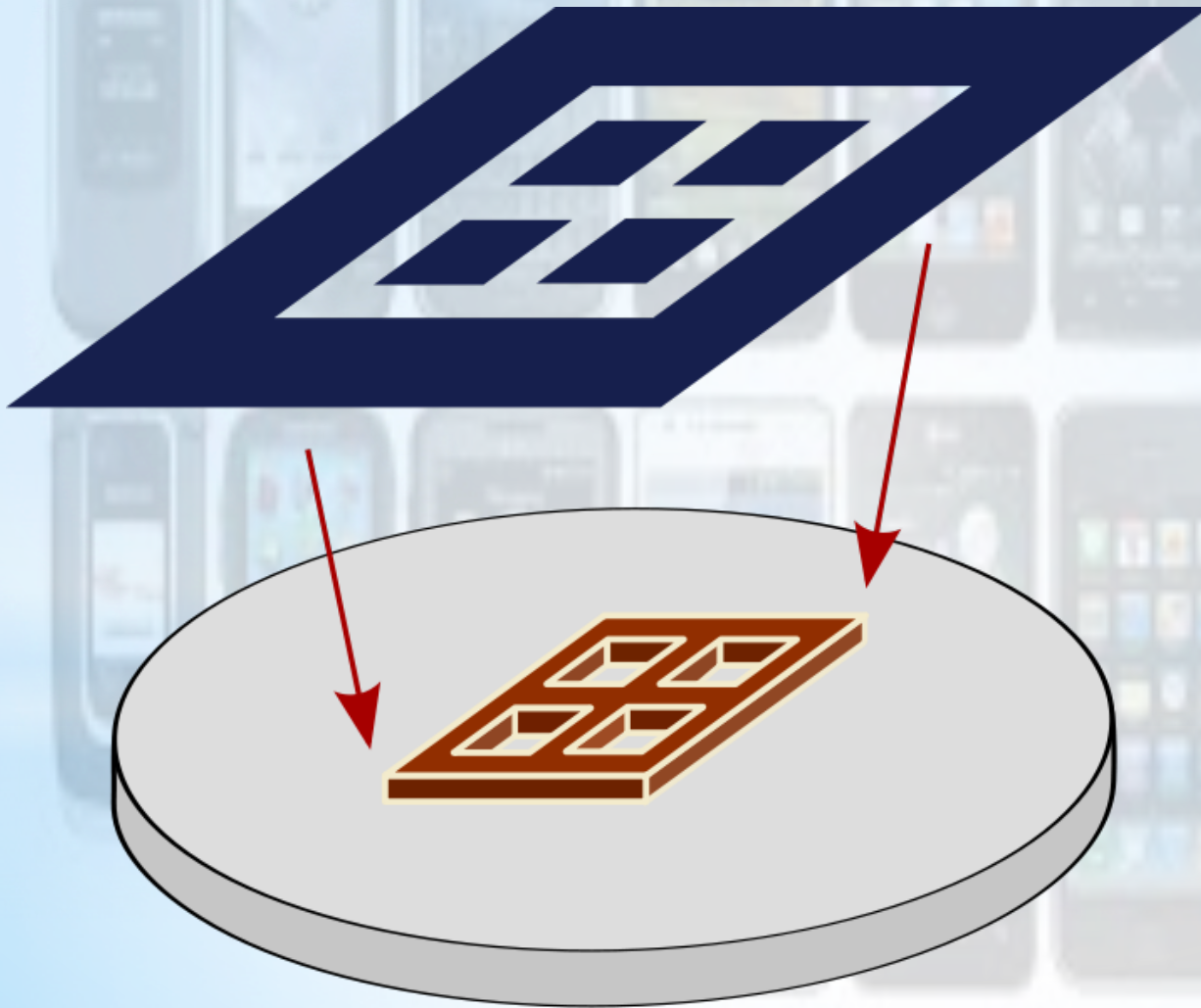


# The Life and Times of a Cell Phone Photolithography....





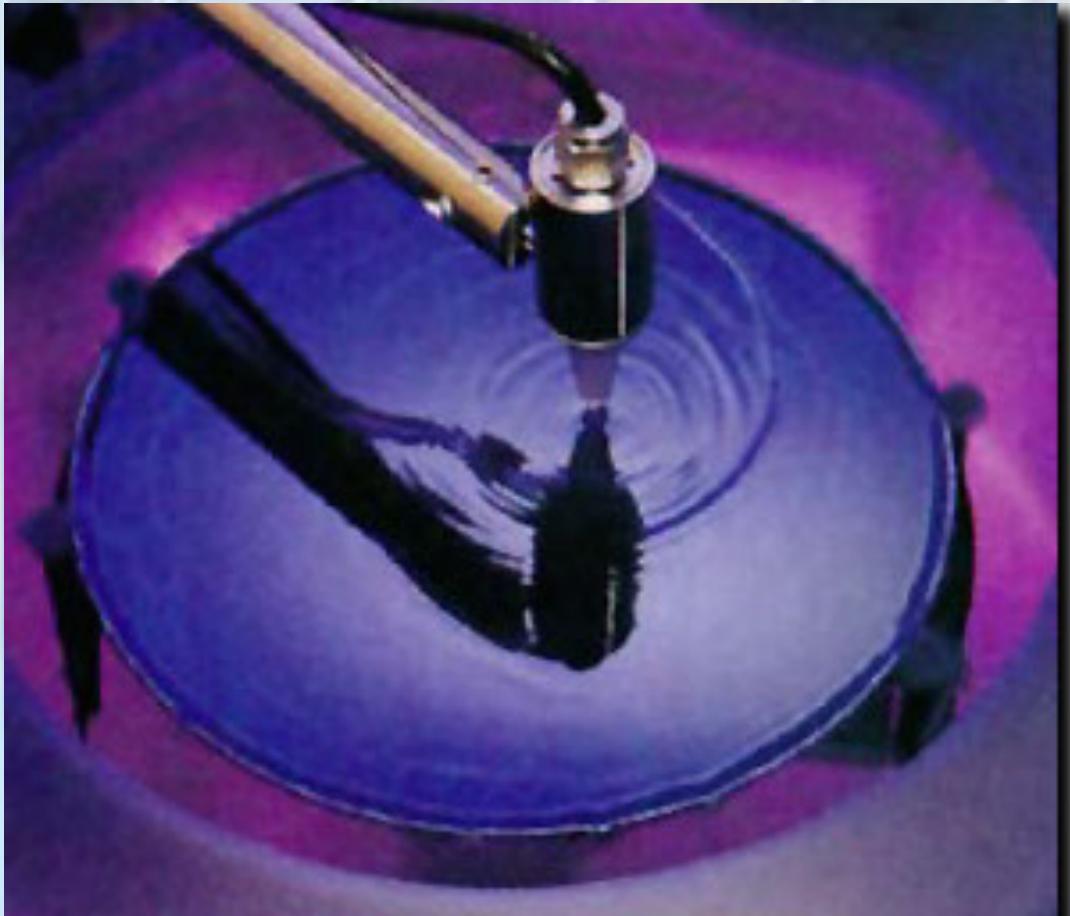
# The Life and Times of a Cell Phone Photolithography...The Mask



The mask is used to expose some areas of the electronic substrate to light and some not.

- If the process is “Positive” - then the area which is exposed to light is then exposed to whatever process comes next.
- If the process is “Negative”, then the area which is not exposed to light is then exposed to whatever process comes next.

# The Life and Times of a Cell Phone Photolithography... The Photoresist

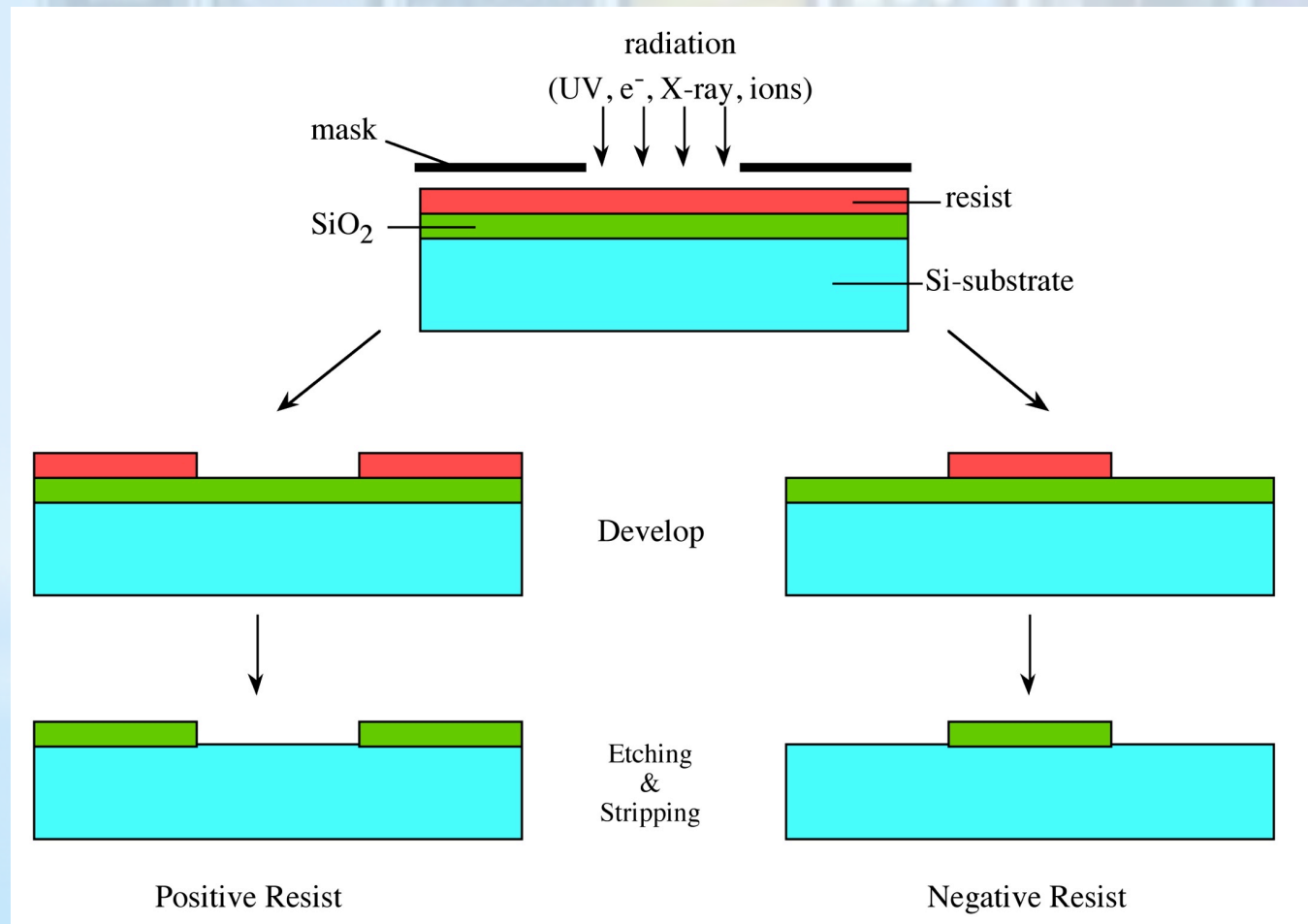


The photoresist is the chemical that is spun on top of the substrate ... and determines whether the process is:

- Positive, or
- Negative

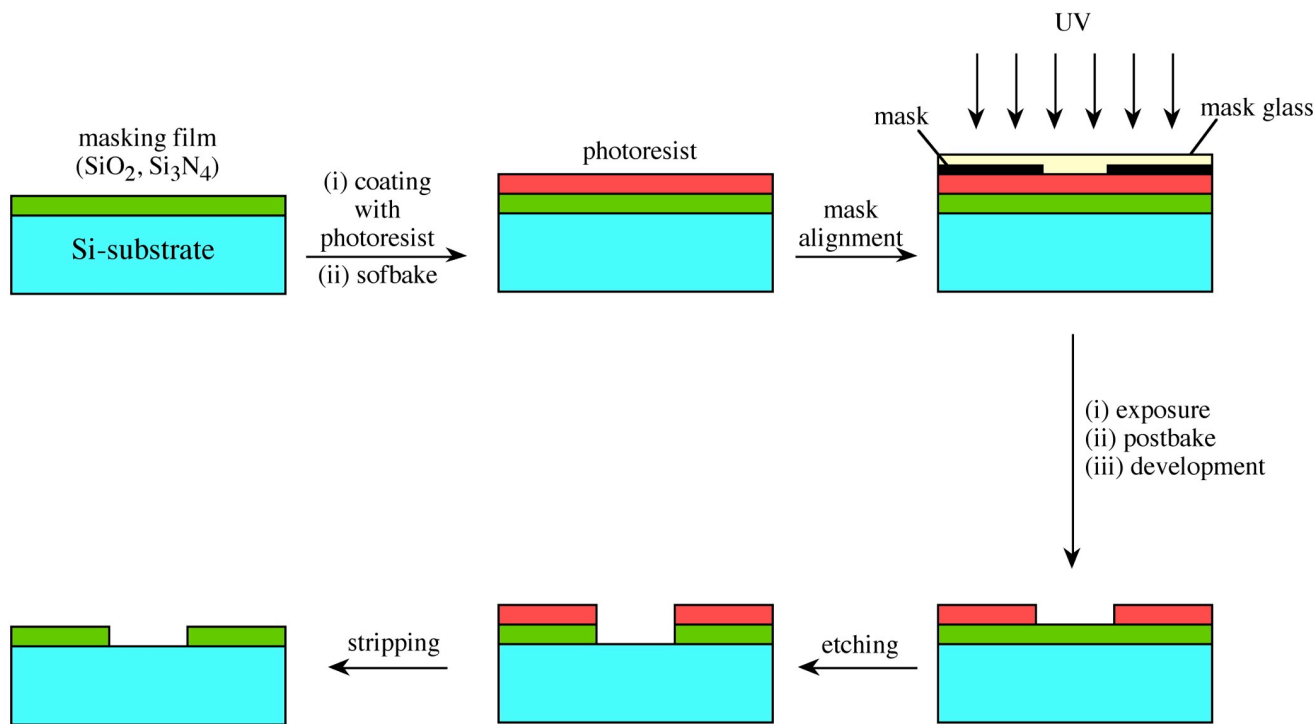


# The Life and Times of a Cell Phone Photolithography... The Exposure



When exposed to light, the photoresist either hardens (as in the case of negative photoresist) or softens (as in the case of positive photoresist), getting it ready to be developed in the next step.

# The Life and Times of a Cell Phone Photolithography... The Developing

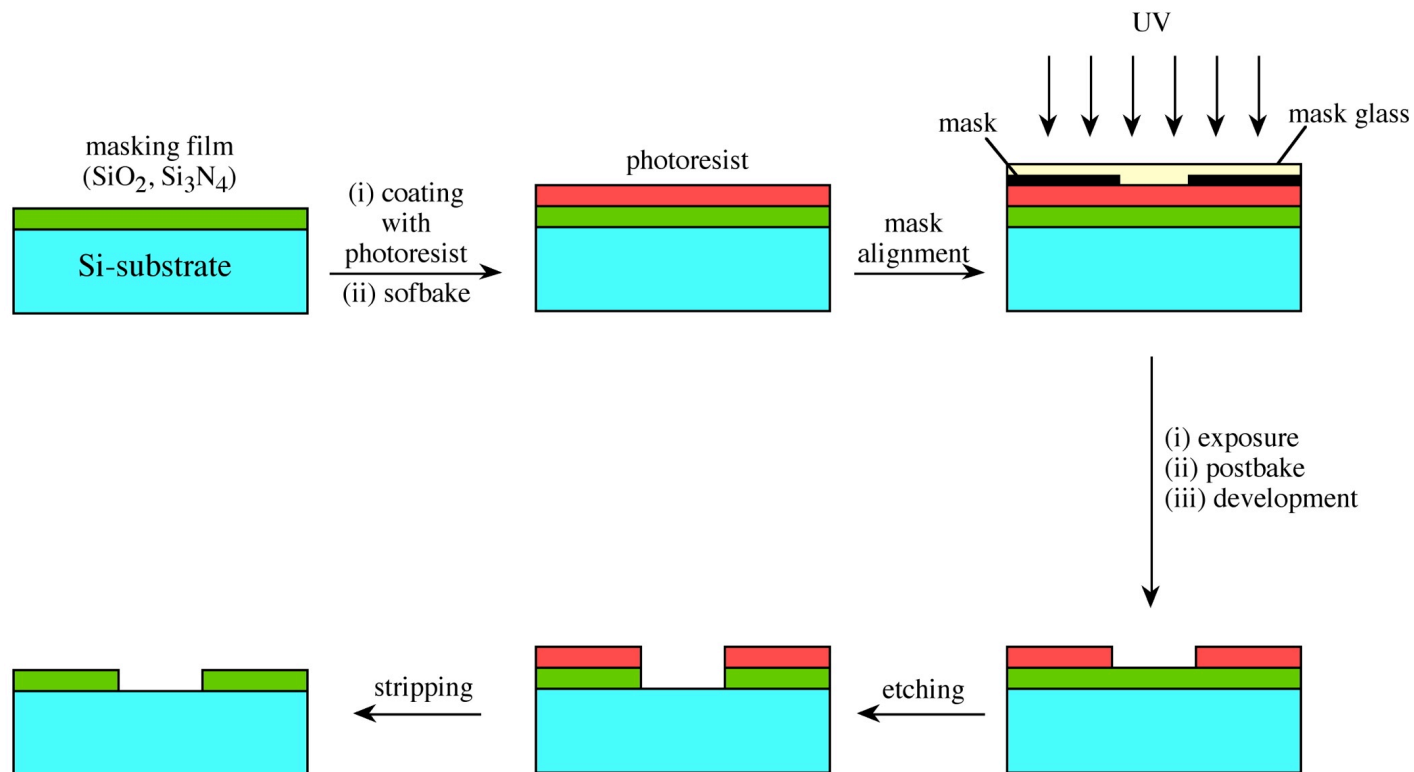


Developing removes the softened photoresist and keeps the rest on the substrate to “protect it” from whatever processing happens next.



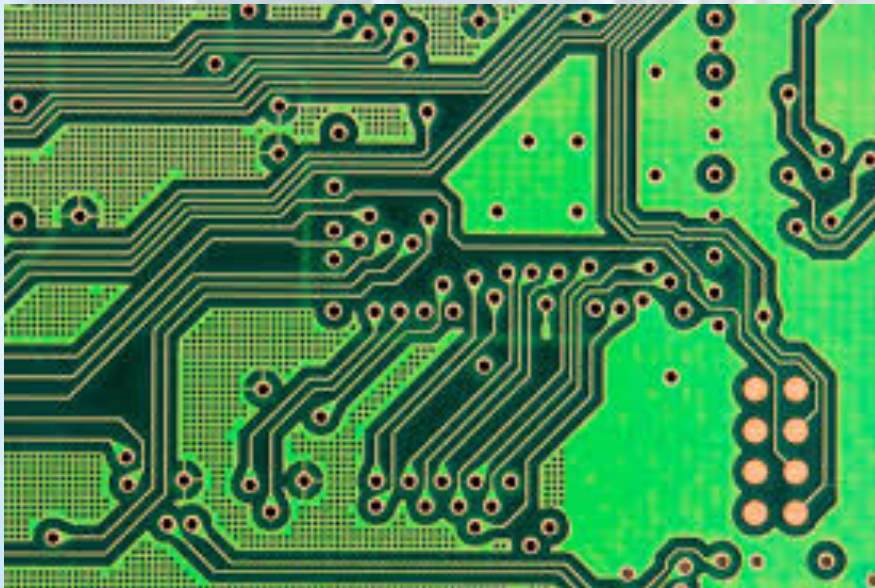
# The Life and Times of a Cell Phone Photolithography... The Processing

Once the photoresist has been patterned and developed, we can then process the exposed areas of our substrate by adding material (deposition) or removing material (etching) depending on our design.



# The Life and Times of a Cell Phone Photolithography....

We can use this process of: covering with photoresist, exposing through a mask, developing, processing (etching or depositing), and stripping (to remove photoresist) to make a wide variety of patterns and designs.



← For “real” electronics

Or for Art or Play





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Can we do it?  
Let's Find Out?