

## 1 | Silicon

- Integrated circuits changed computer circuitries
- Circuits's silicon purified as polycrystalline chunks
  - The cubic seed will form a new cubic silicon
  - Impurities added to silicon to cause it to conduct
  - Negative charged free carrier (arsenic) => n type
  - Positive charged carrier (boron) => p type
- Crystallize ground to form ingots
- Then, sliced thin as wafers
- Wafers are then ground thin + removed of surface contaminants
- Then, wafers are checked for resistivity
- CMOS
  - n-type transistor sandwich a p type region
  - A charge on the gate would cause the charge to go through from source => drain
  - Vice versa
- Meaning, when the P-N circuit combinations are on, the N-P combination is off
- High temperature used to grow silicon dioxide to protect the silicon as silicon interacts with pure oxygen
- Photoresist smeared on the wafer, and light is exposed to each part to etch patterns
- Then, lasers/plasma/acid guides etching of the wafer surface
- Plasma implant impurities to cause conductivity
- Photoresist then washed off
- The wafer is then cleaned off

Then, the actual circuit wires are introduced:

1. Deposition of silicon oxide
2. Photolithography, masking + etching
3. Deposition of tungsten as plug
4. Deposition + patterning of aluminum alloy as wires

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Lastly, the wafer is put into pieces to be placed onto circuits.