Everplate® Cu 300 2TF

Next generation Cu-to-Cu direct bonding

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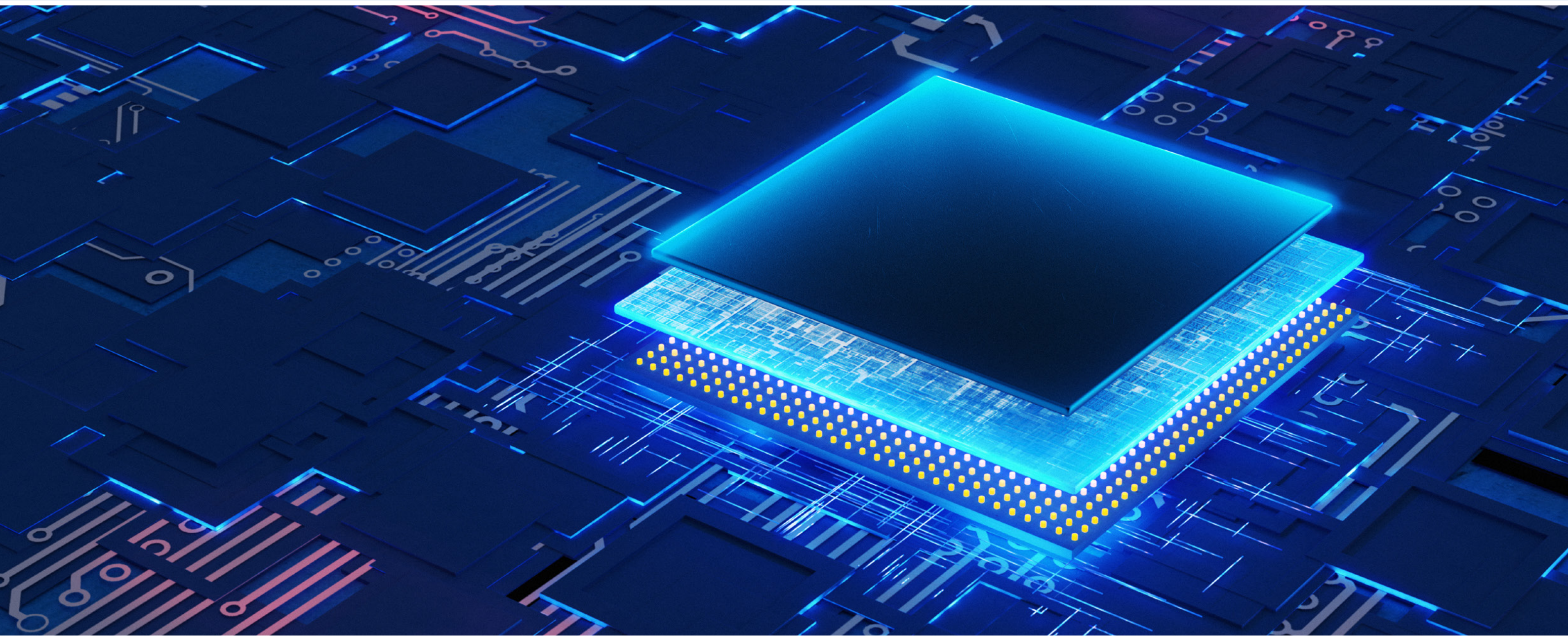

Low temperature annealing Cu for next generation bonding

Copper direct bonding for advanced packaging

Cu-to-Cu direct bonding promises to be one of the key technologies for the manufacturing of next generation semiconductor devices. It allows enhanced device performance due to superior electrical performance and simultaneous smaller form factors and higher reliabilities. Additionally, wafer-to-wafer bonding enables cost advantages and improved production efficiencies.

Everplate® Cu 300 2TF meets the requirements of next generation Cu-to-Cu bonding, for which relatively low bonding temperatures ≤200 °C are required.

Features and benefits

- Bond formations at low temperatures (≤ 200 °C)
- Deposition of pure copper
- Superior via filling capabilities
- High uniformity
- Good ductility
- Good electromigration performance

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Next generation Cu-to-Cu direct bonding

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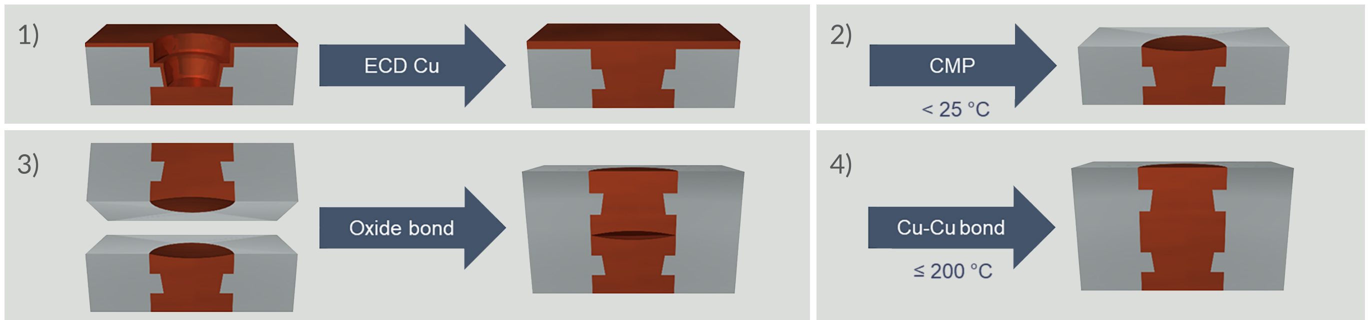
Cu-to-Cu direct bonding sequence based on metastable Cu

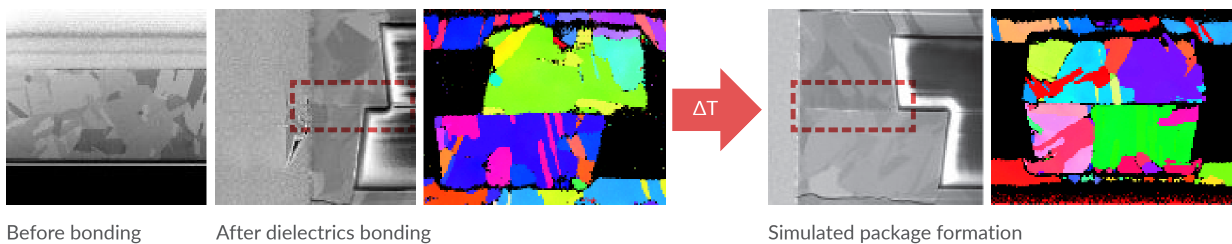


1) Filling of vias with electrolytic metastable Cu; 2) chemical mechanical polishing to remove Cu cover layer; 3) Preliminary dielectrics bonding; 4) annealing step at temperatures ≤ 200 °C to allow Cu-to-Cu bond formation over interface.

Bondformation by metastable copper

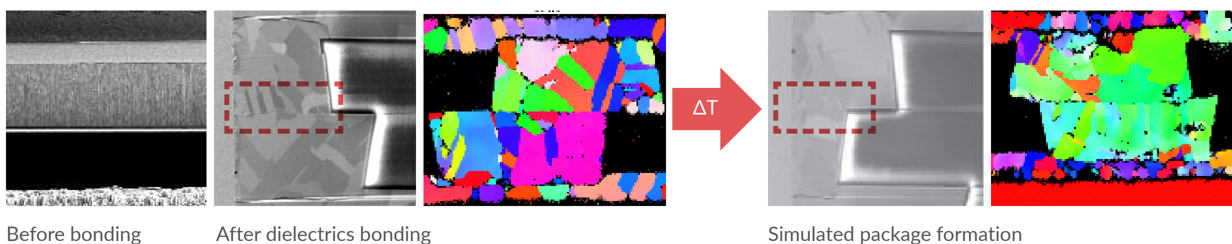
Everplate® Cu 300 2TF is our new process for the deposition of metastable Cu, which allows to execute Cu-to-Cu direct bonding at low temperatures.
Standard processes deposit coarse grained Cu which under low-temperatures does not change its structures and hence requires higher bonding temperatures. Everplate® Cu 300 2TF deposits pure, metastable Cu which recrystallizes at temperatures ≤ 200 °C, leading to a grain growth of the Cu interface and hence a firm bonding step.

Non-optimized process (stable, coarse-grained microstructure)



Before bonding — After dielectrics bonding — Simulated package formation

Optimized process (metastable microstructure)



Before bonding — After dielectrics bonding — Simulated package formation

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