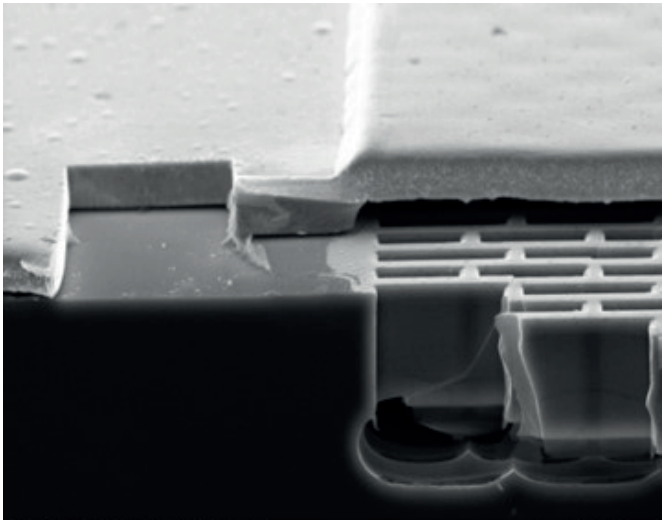
Fraunhofer ENAS

Technologies

Electroplating

Fast Facts

- High flexibility in thickness and substrate material
- High layout variability
- Low temperature processes
- Good adhesion



Ni- Thin film encapsulated AIM structures.

General Description

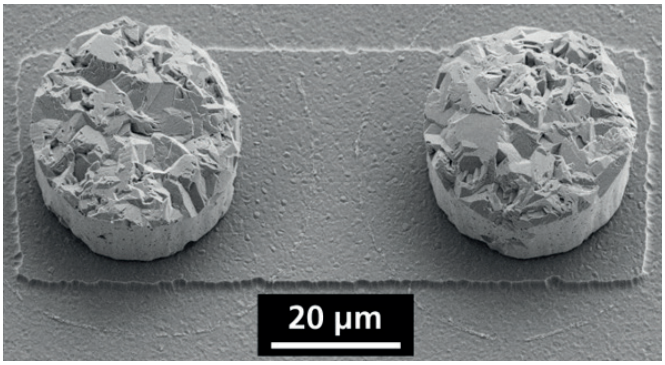
The Fraunhofer ENAS utilizes the electrochemical deposition (ECD) from water-based electrolytes and ionic liquids (ILs) on wafer level. Different applications are addressed such as the formation of intermediate bonding layers (SLID bonding, thermo compression bonding), Through Silicon Vias (TSVs) or multilayers for reactive wafer bonding. Standard processes comprise for instance the deposition of Cu, Ni, Au, Sn/SnAg as well as Al. This can be done as blanket deposition (e.g. for a damascene process) or as pattern plating process by using a photo resist mask. At Fraunhofer ENAS different deposition systems are available as listed below.

Available Deposition Equipment

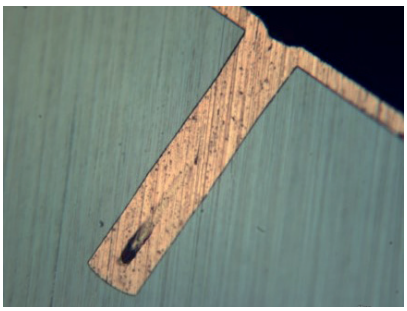
- Fully automatic Fountain plater ClassOne Solstice S4 (100 – 200 mm)
- Semi-automatic vertical deposition tool for 100 – 200 mm wafers (Ramgraber)
- Semi-automatic fountain plater for 100 – 200 mm wafers (RENA)
- Mobile Plating Unit for ionic liquid based ECD (Silicet AG)
- Basic research on beaker level

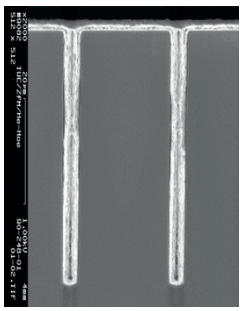
Services

- Standard deposition in small series (e.g. Cu, Ni, Au, …) from water-based electrolytes and ionic liquids on wafer level
- Blanket wafer deposition and pattern plating (incl. photo resist mask)
- Process development on coupon and wafer level ECD-process scale-up from Coupon- to Wafer-level (100…200 mm substrates)
- Customized services upon request (e.g. different materials, PCB substrates)
- Evaluation of different electrolytes in LAB-Scale Equipment
  - Hull Cell test
  - Digital pH meter with data logging (Hanna Instruments)
  - Potentiostat with voltammetry analyzation programs (Princeton Applied Research)
  - Automatic Electrolyte analysis; Metrohm Computrace VA 894
  - UV-VIS spectroscopy
  - FTIR spectroscopy (Bruker)



Aluminum bumps with 30 µm diameter for ultrasonic flip chip bonding.





Metallization of TSV-blind vias.

Specifications

Application	Material	Substrate Size
Intermediate layers for wafer bonding	Cu, Au, SnAg, Al (ILs), (In, Ga , Au80Sn20)	
Multilayer deposition for reactive wafer bonding	Pd, Sn	
Through Silicon Vias (TSVs)	Cu	100 mm – 200 mm
Micropatterns (e.g. coils)	Cu, Ni, Au, Al	
Bumping (UBM, pillars, solder bumps)	Ni, Au, Cu, Sn, SnAg, Al, Au80Sn20	

In cooperation with

ZfM Zentrum für Mikrotechnologien

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