Elevate® Gold 7990 NBV

Electrolytic Sulfite Gold

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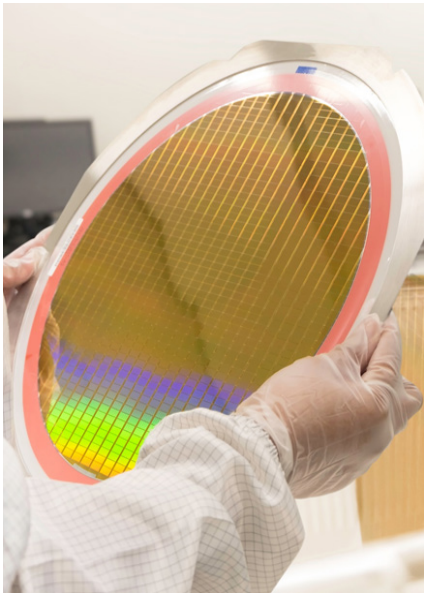
Exceptionally stable, environmentally friendly, and versatile

Gold plating is used for many applications that require good electrical, thermal, and mechanical properties. For example, gold plating is used for a variety of bonding applications due to gold's corrosion resistance and mechanical properties. In flip-chip and chip-scale packaging applications, the under bump metal (UBM) stack has gold as a final surface finish. In bonding applications, the electrical and thermal properties of gold make it useful for backside and via plating on power amplifiers used in cell phone applications. The majority of these applications require a soft, pure gold process.

Sulfite gold processes are the preferred plating chemistries in the semiconductor industry. Legacy cyanide gold plating solutions that are high in toxicity are being phased out for safer, more environmentally responsible products. The problem is traditional sulfite gold solutions also have inherent weaknesses. The sulfite complex is not as strong and the cyanide complex making the solution less stable. The high pH of sulfite gold can make the chemistry incompatible with some photoresist, presenting costly problems with the bath and adhesion. Another significant problem is the short bath life of sulfite gold processes making operating costs much higher than cyanide gold systems. Finally, while sulfite gold solutions are cyanide-free, they still present toxicity concerns because of their use of arsenic or thallium as grain refiners.



Technic's Elevate Gold 7990 NBV eliminates all the inherent weaknesses of traditional sulfite gold processes. Because Elevate Gold 7990 NBV operates at a pH of 6.3, it is compatible with all photoresists. At this pH, the deposit is bright, negating the need for toxic metallic grain refiners. The acidic pH extends the bath life by allowing the bath to be able to produce optimum results at high specific gravity levels. A proprietary stabilizer dramatically increases the stability of the solution throughout the life of the bath.

Features

- Very stable electrolyte
- Low-stress deposit
- Smooth, bright deposit without the use of harmful metallic grain refiners
- Low deposit thickness variation across the wafer even with small and large features on the same die
- Able to deposit 2 – 3 times more gold in vias compared to a standard sulfite gold process
- Extended bath life of 4 – 5 metal turnovers in most applications
- Currently in production around the world in high volume manufacturing

Benefits

- Reduced cost of operation through:
    - Extended bath life which significantly reduces the number of bath makeups per year
    - Stable electrolyte eliminates scrap produced from bath plate-out
    - Excellent coplanarity and step coverage resulting in less gold used per wafer
    - High-speed plating increases wafer production capabilities
- Free of cyanide, thallium, and arsenic making it safe for operators and environmentally responsible.
- For use in plating tools from manual wet bench and R&D to fully automatic production lines.
- One of the most widely used and reliable sulfite gold chemistry in the semiconductor industry.

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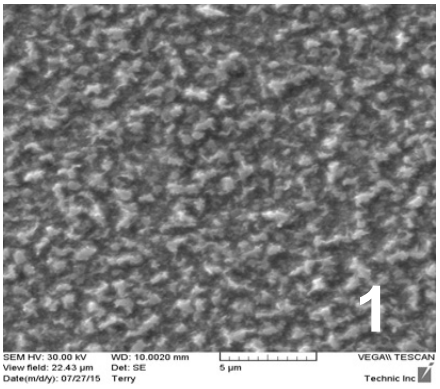
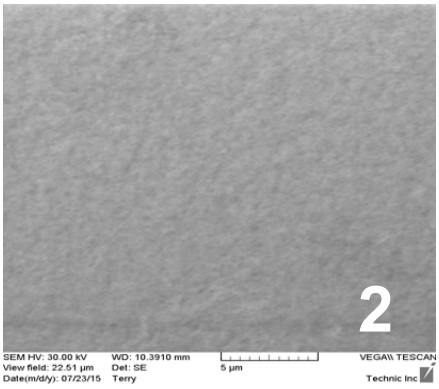
Smooth and Bright Deposit

A smooth and bright deposit is obtained without the use of harmful additives such as thallium and arsenic.





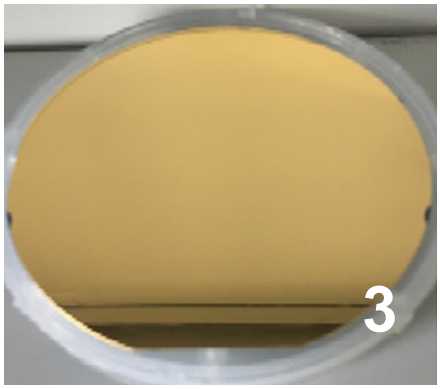
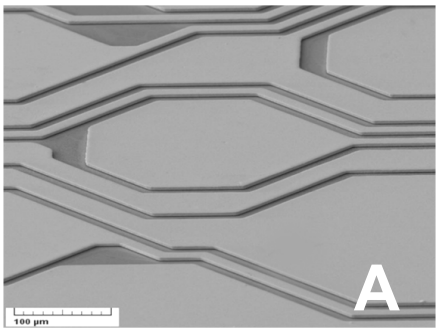
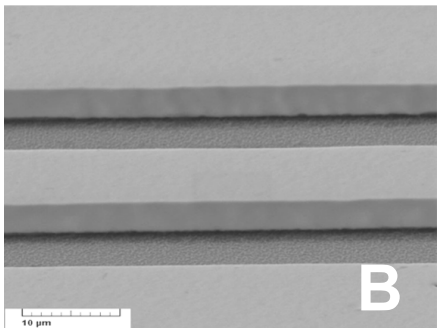


Image 1 shows a typical deposit from a standard sulfite gold bath.
Image 2 shows the smooth deposit of Elevate Gold 7990 NBV.
Image 3 shows Elevate Gold 7990 NBV bright deposit appearance.

Thick Plating

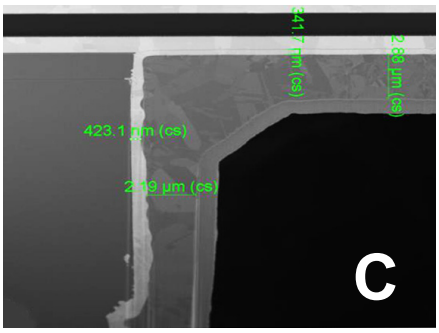
The acidic pH of the chemistry allows for thick plating without compromising the resist. **Image A** shows features that are plated with 7 microns of gold. **Image B** shows sharp edges, smooth surface, and no under-plating. Overall excellent feature shape retention.

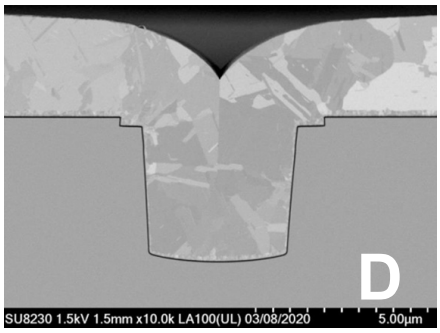




Via Plating

Images C and **D** show excellent results with 7990 NVB conformal, and via fill applications. Vias can be plated without having to reduce the current density to achieve the targeted results.





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