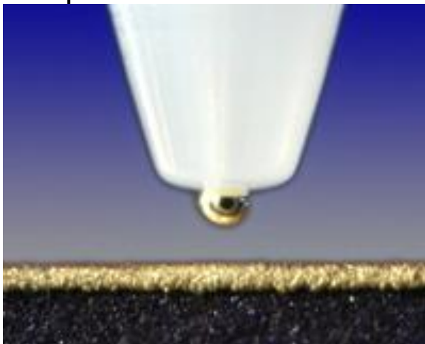
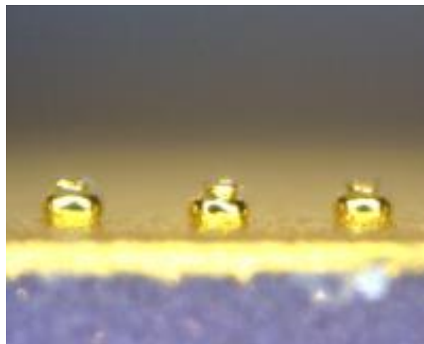
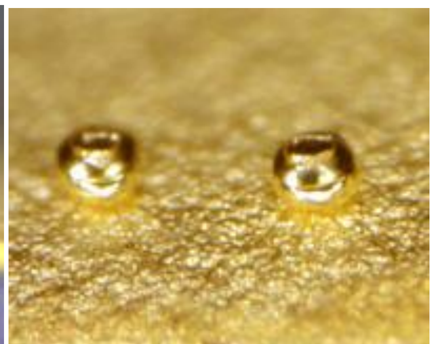
TPT-Application Bump bonding

Equipment:

- 25µ gold wire
- „Standard-capillary" for 25µ gold wire
- TAB / Coining Tool
- Semi-automatic Ball Bonder HB16

Bump without Tail:

Capillary Bumps without Tail

Overview:

Bump bonding is used for flip-chip applications. For flip-chip assembly a chip is mounted top-side-down directly on a substrate/chip. No wires are used. The contact is established by beforehand applied bumps. Advantages of this method are the compactness and the low inductance, due to the short conductor lengths. Furthermore, it is possible to stack multiple chips on each other.
On the following example we show a very simple bump-bonding, using standard wire and capillaries.

Bonding process – flattened bumps without tail:

- A possibility to create identical bumps without tail it to flatten the bumps after setting them.
- A simple method is to use the ball-bonding mode, where the 2nd bond is used to tear off the wire and smoothen the bump. For this purpose a special bond profile is created on HB16 with motorized Z-& Y-axis.
- Another possibility is the use of special coin- or tab-tools that have a flat bonding foot.

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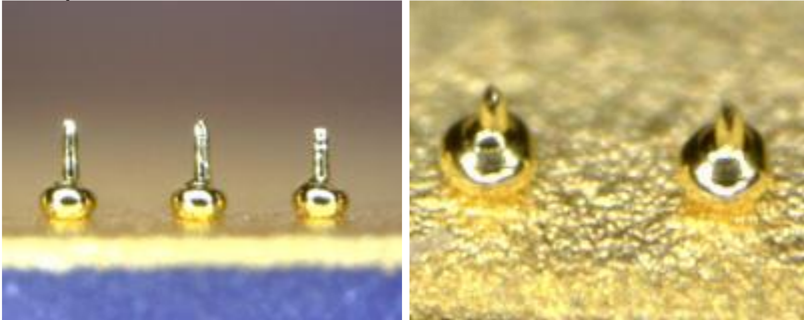
Bump with Tail:



Bonding process – bumps with tail:

- The machine bonds a bump on the target pad. Afterwards the bond head moves up and the wire is torn off. Then a new ball is automatically formed with the help of EFO (Electronic Flame Off). Now the bonder is ready to set the next bump.
- The bonding parameters are similar to the standard ball-bonding values. The ball size depends on the adjusted tail length. Here a value of 500µ is used.
- If smaller bumps are required, 17µ wire and a special bump-or fine-pitch capillary will be utilized. With these settings bumps of 50µ diameter are feasible.
- Sometimes a more constant wire tear-off is required, that means the wire sticking out of the ball needs to have an identical length. This can be achieved by using a stiffer wire. These wires rather tend to build up a breaking point, which fairly restricts the variation.

Security Bump bonding:

Another application for Bump bonding is the "Security bump", in this method the Bump stabilized the second bond from a normal Ball-Wedge bonding.

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