

New method for the selective deposition of thin films based on a set of self-aligned metallic masks

A new shadow-masking method based on a set of self-aligned metallic masks, allowing the selective metallization of microelectronic substrates and devices for the implementation of tracks and pads has been patented. The proposed method avoids photolithographic or chemical processes, is easy to implement, cheap and provides a good resolution (tens of microns). Industrial partners mainly working on deposition of metals and thin layers in general are being sought to collaborate in the implementation of this technology and to exploit the existing know-how through a patent license agreement.

An innovative selective deposition method

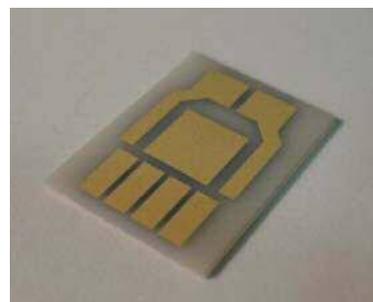
The invention proposes a new shadow-masking technique for the selective deposition of thin layers of different materials over microelectronic substrates and/or devices. It is based on a set of masks, self-aligned with the substrate that doesn't need any photolithographic process or any complex optical alignment system. The masks are self-aligned by several rods matching with corresponding orifices on the masks. The orifices on the top mask define the deposition patterns, while those on the bottom mask place correctly the substrate. A frame screwed on the top allows fixing the set of masks and the substrates.

Easy, cheap and fast shadow-masking method

Nowadays there are several techniques for depositing thin layers of metals and dielectric materials. However all these techniques show some drawbacks: substrates are in contact with chemical products, not always are suitable for microelectronic substrates and devices and/or the masks are fragile, complex and expensive elements. The current process is able to remetalize the Al pads of power devices allowing their topside brazing or chip-embedding techniques; to define pads and tracks in ceramic substrates and also to define contacts in piezo substrates.

Main advantages and applications

- Allows the selective deposition of materials on microelectronic devices or substrates using evaporation or sputtering equipments.
- It avoids photolithographic processes and, consequently, any contact of the substrates with chemical products (photoresist, etching products, etc.)
- The alignment of the substrate with the masks is automatically solved avoiding complex optical systems. Allowing a fast preparation of the samples with the subsequent reduction of the processing costs.
- The method is suitable for applications where the standard photolithographic processes are not possible.
- Very useful for the re-metallization of the top Al contact pads of power devices to allow subsequent soldering steps, to contact nanotubes grown on a given substrate, or to establish pads and tracks on ceramic substrates.



The new method allows a fast preparation of the samples, avoiding complex optical systems for the alignment of the substrate, with the subsequent reduction of the processing costs

Patent Status

European granted patent.

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