

CLAIMS:

1. Method of manufacturing a routable electroforming substrate for assembling a semiconductor package, comprising the steps of:
 - 5 providing a carrier;
 - plating a patterned first metallic layer onto the carrier which is configured to function as a surface mount pad or input/output pad in an assembled semiconductor package;
 - plating a patterned second metallic layer comprising copper over the
 - 10 first metallic layer;
 - plating a third metallic layer over the second metallic layer which is configured for mounting a plurality of semiconductor dice onto the third metallic layer; and thereafter
 - removing the carrier to expose the first metallic layer;
 - 15 wherein the step of removing the carrier is performed prior to mounting the semiconductor dice onto the third metallic layer.
2. The method as claimed in claim 1, wherein the carrier is made of an electrically conductive material which is attractable by magnetic forces.
- 20 3. The method as claimed in claim 2, wherein the carrier comprises stainless steel grade 430.
4. The method as claimed in any one of the preceding claims, further
- 25 comprising the step of roughening an exposed surface of the carrier by removing a portion of the said exposed surface prior to plating the first metallic layer.
5. The method as claimed in any one of the preceding claims, wherein the
- 30 steps of plating the first and second metallic layers are conducted by electroplating.

6. The method as claimed in any one of the preceding claims, wherein the first metallic layer comprises a gold layer, gold-nickel layers or gold-palladium-nickel layers.

5 7. The method as claimed in claim 6, further comprising the step of plating a copper layer over the gold layer, gold-nickel layers or gold-palladium-nickel layers, prior to plating the second metallic layer.

10 8. The method as claimed in any one of the preceding claims, wherein the second metallic layer has a smaller surface area than that of the first metallic layer, and serves as via interconnects to the first metallic layer.

9. Method of manufacturing a routable electroforming substrate for assembling a semiconductor package, comprising the steps of:

15 providing a carrier;

plating a patterned first metallic layer onto the carrier which is configured to function as a surface mount pad or input/output pad in an assembled semiconductor package;

20 plating a patterned second metallic layer comprising copper over the first metallic layer;

encapsulating the first and second metallic layers in a dielectric material, prior to plating a third metallic layer;

25 plating the third metallic layer over the second metallic layer which is configured for mounting a plurality of semiconductor dice onto the third metallic layer; and thereafter

removing the carrier to expose the first metallic layer.

10. The method as claimed in claim 9, further comprising the step of planarizing the dielectric material and second metallic layer and forming a
30 conductive seed layer onto a top surface thereof, such that the third metallic layer is plated on the conductive seed layer.

11. The method as claimed in any one of the preceding claims, further comprising the step of bonding a plurality of semiconductor dice onto the third metallic layer, prior to removing the carrier to expose the first metallic layer.

5 12. The method as claimed in claim 11, further comprising the step of connecting wire bonds between the plurality of semiconductor dice and the substrate prior to removing the carrier.

10 13. The method as claimed in claim 11 or claim 12, further comprising the step of encapsulating the semiconductor dice with a dielectric layer after bonding the plurality of semiconductor dice.

15 14. The method as claimed in any one of the preceding claims, further comprising the step of plating on selected portions of the third metallic layer a surface finishing comprising a nickel-gold layer, a nickel-palladium-gold layer or a silver layer.

15 15. The method as claimed in any one of the preceding claims, wherein the carrier is removed by peeling the carrier away from the first metallic layer.