[0006] It would be desirable to provide methods that minimize these problems.

BRIEF DESCRIPTION

[0007] The present disclosure relates to methods of making cover lids for use in hermetic sealing of electronic packages. The cover lid is formed from a plate. A mask, for example a polyamide mask, is applied to a surface of the plate, thus defining a central area covered by the mask and a peripheral area not covered by the mask. The peripheral area and the sidewall of the plate are metallized to form a seal ring, and the polyamide mask is removed. As desired, the seal ring can be formed from additional metal sublayers. A solder preform can then be attached to the seal ring, for example by tack welding.

[0008] Disclosed herein are various methods of making a cover lid, comprising: applying a ~~polyamide~~ mask to a central area of a first surface of a plate and define a peripheral area on the first surface, wherein the plate has a first surface, a second surface, and a sidewall joining the first surface and second surface together; forming a seal ring by metallizing the peripheral area and the sidewall of the plate; and removing the polyamide mask to obtain the cover lid.

[0009] The plate can be made from beryllium-copper, molybdenum, bronze, glass, an iron-nickel-cobalt alloy, or a ceramic selected from the group consisting of alumina (Al_2O_3), beryllia (BeO), aluminum nitride (AlN), zirconia toughened alumina (ZTA), SiC, and Si_3N_4. The plate may have a thickness of about 0.5 millimeter to about 1 millimeter. In some particular embodiments, the plate is formed from a non-magnetic material.

[0010] The peripheral area which is metallized may be from about 20% to about 35% of the surface area of the first surface of the plate.

[0011] In some embodiments, the seal ring is formed from a metal selected from the group consisting of silver, palladium, platinum, nickel, gold, and alloys thereof. Sometimes, the seal ring can be formed from a set of sublayers. In other embodiments, the seal ring can be formed from a non-magnetic metal.

[0012] The seal ring on the peripheral area may have a width of about 0.5 mm to about 1 mm. The seal ring on the peripheral area can have a thickness of about 1 micrometer (μm) to about 40 μm.

[0013] The plate can be in the shape of a disk or a rectangular prism. The sidewall may have a plurality of faces.

[0014] The methods may further comprise tack welding a solder preform to the seal ring on the peripheral area. The solder preform can have a melting temperature of from about 200°C to about 350°C. The solder preform may be formed from a gold-tin alloy, a lead-based alloy, or a lead-free alloy.

[0014A] The mask may be polymeric. The mask may be a polyamide.

[0014B] Also disclosed herein are cover lids produced by the method described above.

[0015] Also disclosed herein are cover lids, comprising: a plate comprising a first surface, a second surface, and a sidewall joining the first surface and second surface together; a seal ring on a peripheral area of the first surface and the sidewall of the plate; and a solder preform connected to the seal ring on the peripheral area.

[0016] The plate can be made from beryllium-copper, molybdenum, bronze, glass, an iron-nickel-cobalt alloy, or a ceramic selected from the group consisting of alumina (Al2O3), beryllia (BeO), aluminum nitride (AlN), zirconia toughened alumina (ZTA), SiC, and Si3N4.

[0017] The seal ring can be formed from a metal selected from the group consisting of silver, palladium, platinum, nickel, gold, and alloys thereof. Sometimes, the seal ring is formed from a set of sublayers. The solder preform may also be formed from a gold-tin alloy, a lead-based alloy, or a lead-free alloy.

[0018] These and other non-limiting characteristics of the disclosure are more particularly disclosed below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The following is a brief description of the drawings, which are presented for the purposes of illustrating the exemplary embodiments disclosed herein and not for the purposes of limiting the same.

[0020] **FIG. 1** is a side cross-sectional view of a conventional electronic package.

[0021] **FIG. 2** is an exploded perspective view of a conventional electronic package.

[0022] **FIG. 3** is a perspective view of an “ideal” cover lid having a plate with a metallized seal ring thereon.

[0023] **FIG. 4** is a perspective view of a cover lid in which the seal ring is undesirably offset.