

Claims

1. A substrate carrier stack comprising:
a plurality of substrate carriers stacked in a vertical direction such that, for each pair of vertically adjacent substrate carriers, a lower substrate carrier supports an upper substrate carrier; wherein
each of the plurality of substrate carriers includes an outer carrier frame extending in a horizontal frame plane around an inner zone that includes an inner opening;
each of the plurality of substrate carriers includes a substrate seat to accommodate and carry a substrate within an inner accommodation space of the substrate carrier stack, the inner accommodation space being defined by the inner openings of the plurality of substrate carriers;
each of the plurality of substrate carriers includes, at the outer carrier frame, an upper supporting formation and a lower supporting formation, the upper supporting formation of the lower substrate carrier supporting the lower supporting formation of the upper substrate carrier;
the outer carrier frame of each of the plurality of substrate carriers includes a first frame web extending along a first frame web axis, a second frame web extending along a second frame web axis, a third frame web extending along a third frame web axis, and a fourth frame web extending along a fourth frame web axis;
the first frame web axis intersects the fourth frame web axis at a right angle at a first vertex of the first frame web and the fourth frame web, the first frame web and the fourth frame web are connected at a first frame vertex region of the outer carrier frame;
the first frame web axis intersects the second frame web axis at a right angle at a second vertex of the first frame web and the second frame web, the first frame web and the second frame web are connected at a second frame vertex region of the outer carrier frame; the third frame web axis intersects the fourth frame web axis at a right angle at a fourth vertex of the third frame web and the fourth frame web, the third frame web and the fourth frame web are connected at a fourth frame vertex region of the outer carrier frame;
the third frame web axis intersects the second frame web axis at a third vertex of the third frame web and the second frame web, the third frame web and the second frame web are connected at a third frame vertex region of the outer carrier frame;
each of the plurality of substrate carriers includes a plurality of substrate holding arms that extend inwardly and upwardly from the outer carrier frame, overlap the inner zone, and define the substrate seat;
the substrate seat is located at a distance above the outer carrier frame in the vertical direction;
each of the plurality of substrate carriers includes a plurality of partition webs that extend from the outer carrier frame through the inner zone to define the inner opening and two auxiliary openings of the inner zone;
a first arc-shaped portion of the plurality of partition webs extends in a first space between the fourth frame web and the inner opening to define a first of the two auxiliary openings;
a second arc-shaped portion of the plurality of partition webs extends in a second space between the second frame web and the inner opening to define a second of the two auxiliary openings;
the first auxiliary openings and the second auxiliary openings of the inner zones of the plurality of substrate carriers collectively define a first purging channel and a

second purging channel that extend vertically parallel or substantially parallel to the inner accommodation space at opposing sides of the inner accommodation space; and

the plurality of substrate carriers include purging structures that create horizontal purging flows within the substrate carrier stack through spaces between substrates held by the substrate seats of the plurality of substrate carriers.

2. The substrate carrier stack according to claim 1, further comprising:
a cover that is stacked on the plurality of substrate carriers and is supported by an uppermost substrate carrier of the plurality of substrate carriers; and
a base on which the plurality of substrate carriers are stacked, the base supports a lowermost substrate carrier of the plurality of substrate carriers.

3. The substrate carrier stack according claim 2, wherein the upper supporting formation includes an upper sealing formation, and the lower supporting formation includes a lower sealing formation;
the upper sealing formation of the uppermost substrate carrier of the plurality of substrate carriers engages with a sealing formation of the cover; and
the lower sealing formation of the lowermost substrate carrier of the plurality of substrate carriers engages with a sealing formation of the base to seal the inner accommodation space, the first purging channel, and the second purging channel from an area surrounding the substrate carrier stack.

4. The substrate carrier stack according claim 2, wherein one of the cover and the base includes a first port connected to the first purging channel;
one of the cover and the base includes a second port connected to the second purging channel; and
a purging gas is supplied into the substrate carrier stack via one of the first port and the second port that defines a supply port and is discharged from the substrate carrier stack via the other of the first port and the second port that defines a discharge port such that the purging gas flows through the inner accommodation space via the first purging channel, the second purging channel, and purging passages defined by the purging structures.

5. The substrate carrier stack according claim 4, wherein the first port is connected to the first purging channel via a first laminariser included in the one of the cover and the base that includes the first port;
the second port is connected to the second purging channel via a second laminariser included in the one of the cover and the base that includes the second port; and
each of the first laminariser and the second laminariser includes a gas filtering medium and/or a gas distribution manifold that suppresses turbulences in the purging gas that passes therethrough.

6. The substrate carrier stack according claim 2, wherein the cover includes purging formations connected to the first purging channel and the second purging channel and provide purging passages in which purging gas flows to the substrate seat of the uppermost substrate carrier or the substrate seats of a predetermined number of uppermost substrate carriers of the plurality of substrate carriers; and

the purging passages provided by the purging formations connect a portion of the inner accommodation space with the first purging channel and the second purging channel.

7. The substrate carrier stack according to claim 1, wherein the purging structures define purging passages, and the each pair of vertically adjacent substrate carriers is provided with the purging passages which pass through the first arc-shaped portions and the second arc-shaped portions of the partition webs of the substrate carriers;
a first portion of the inner accommodation space is connected with the first purging channel through a first purging passage such that purging gas flows between the first purging channel and the first portion of the inner accommodation space; and
a second portion of the inner accommodation space is connected with the second purging channel through a second purging passage such that the purging gas flows between the second purging channel and the second portion of the inner accommodation space.

8. The substrate carrier stack according to claim 7, wherein the purging passages are defined by an upper surface of the first arc-shaped portion or the second arc-shaped portion of the lower substrate carrier and a lower surface of the first arc-shaped portion or the second arc-shaped portion of the upper substrate carrier.

9. The substrate carrier stack according to claim 7, wherein the purging passages are defined by elongated nozzle openings including an opening width in the vertical direction that tapers towards the inner accommodation space.

10. The substrate carrier stack according to claim 7, wherein each of the purging passages included in the substrate carrier stack are provided within the substrate carrier stack at equidistant positions in the vertical direction.

11. The substrate carrier stack according to claim 1, wherein the upper supporting formation includes an upper sealing formation, and the lower supporting formation includes a lower sealing formation;
a first of the upper sealing formation and the lower sealing formation includes a continuous sealing lip that extends continuously around the inner zone, and a second of the upper sealing formation and the lower sealing formation includes a continuous sealing surface strip that extends continuously around the inner zone;
for the each pair of vertically adjacent substrate carriers, the lower sealing formation of the upper substrate carrier engages with the upper sealing formation of the lower substrate carrier to seal the inner accommodation space, the first purging channel, and the second purging channel from an area surrounding the substrate carrier stack.

12. The substrate carrier stack according to claim 1, wherein each of the plurality of substrate carriers includes a first positioning formation and a second positioning formation such that, for the each pair of vertically adjacent substrate carriers, the first positioning formation of the lower substrate carrier engages with the second positioning formation of the upper substrate carrier; and each of the plurality of substrate carriers includes a vertical protrusion defining a first of the first positioning formation and the second positioning formation, and a recess

or opening defining a second of the first positioning formation and the second positioning formation.

13. The substrate carrier stack according to claim 1, wherein all of the plurality of substrate carriers have a same structure or substantially a same structure; and the substrate carriers of the each pair of vertically adjacent substrate carriers are stacked such that: the first frame web of the lower substrate carrier supports the third frame web of the upper substrate carrier, the second frame web of the lower substrate carrier supports the fourth frame web of the upper substrate carrier, the third frame web of the lower substrate carrier supports the first frame web of the upper substrate carrier, and the fourth frame web of the lower substrate carrier supports the second frame web of the upper substrate carrier.

14. The substrate carrier stack according to claim 1, wherein each of the plurality of substrate carriers includes projections that project horizontally from an outer peripheral surface of the outer carrier frame.

15. The substrate carrier stack according to claim 1, wherein each of the plurality of substrate carriers includes a first pair of projections that project from an outer peripheral surface of the outer carrier frame in a first horizontal direction and a second pair of projections that project from the outer peripheral surface of the outer carrier frame in a second horizontal direction that is different from the first horizontal direction.

16. A substrate carrier stack comprising: a plurality of substrate carriers stacked in a vertical direction; wherein each of the plurality of substrate carriers includes a substrate seat to accommodate and carry a substrate within an inner accommodation space of the substrate carrier stack; the plurality of substrate carriers include a first purging channel and a second purging channel that extend vertically parallel or substantially parallel to the inner accommodation space at opposing sides of the inner accommodation space; the plurality of substrate carriers include purging structures that create horizontal purging flows within the substrate carrier stack; and each of the plurality of substrate carriers includes an outer carrier frame extending in a horizontal frame plane around the first purging channel, the second purging channel, and the inner accommodation space.

17. The substrate carrier according to claim 16, wherein each of the plurality of substrate carriers is integrally molded from a plastic material.

18. A substrate carrier comprising: an outer carrier frame extending in a frame plane around an inner zone including an inner opening; a plurality of partition webs that extend from the outer carrier frame through the inner zone to define the inner opening and two auxiliary openings of the inner zone; the two auxiliary openings define a portion of a first purging channel and a portion of a second purging channel that extend vertically parallel or substantially parallel to the

inner zone when the substrate carrier is one of a plurality of substrate carriers stacked in a vertical direction.

19. The substrate carrier according to claim 18, wherein the substrate carrier is integrally molded from a plastic material.

20. The substrate carrier according to claim 18, wherein the substrate carrier is integrally molded from polyether ether ketone or polycarbonate.