CLAIMS

1. A linear sputtering system, comprising:

an entry loadloack chamber and an exit loadlock chamber;

an in-line processing chamber allowing carriers to pass from said entry loadlock chamber to said exit loadlock chamber during continuous processing, the in-line processing chamber comprising:

at least one single-pass processing section positioned between the entry loadlock chamber and exit loadlock chamber;

at least one multi-pass processing section positioned between the entry loadlock chamber and the exit loadlock chamber;

a plurality of substrate carriers;

a transport system transporting the substrate carriers through the entry loadlock chamber, the at least one single-pass process section, the at least one multi-pass process section and the exit loadlock chamber at multiple speeds independently controlled in different sections and chambers;

wherein the at least one multi-pass processing section comprises a sputtering magnetron arrangement and is configured to include front and rear buffer regions to house a single substrate carrier for performing a multi-pass processing, and the at least one single-pass chamber comprises one or more magnetron arrangements arranged along a carrier travel direction, the single-pass chamber configured to include buffer areas to house carriers entering and exiting the single pass processing section as well as multiple carriers arranged serially in a row for a single-pass of continuous processing.

2. The system of claim 1, wherein the sputtering magnetron arrangement comprises a paired magnetron forming abutting sputtering cones and the one or more sputtering magnetron arrangements comprises at least one paired magnetron.

3. The system of claim 2, wherein each of the paired magnetrons comprises a gas injector positioned between the paired magnetrons.

4. The system of claim 1, wherein one multi-pass processing section is positioned between the entry loadlock and the single-pass processing section and a second multi-pass processing section is positioned between the single-pass processing section and the exit loadlock.

5. The system of claim 4, wherein an open slit without a gate valve is provided between each of the multi-pass processing sections and the single-pass processing section.

6. The system of claim 1, wherein the transport system transports the plurality of substrate carriers within the single-pass section in unison at a first transport speed and transports the single carrier within the multi-pass section in a forward and reverse motions at a second speed faster than the first speed.

7. The system of claim 6, wherein the second speed is configured such that the single carrier in the multi-pass section traveling at the second process speed can perform at least two forward and one reverse passes during the time that a carrier in the single-pass section traveling at the first process speed performs one pass.

8. The system of claim 1, further comprising at least one buffer section coupled to the multi-pass chamber.

9. A linear processing system, comprising:

an entry loadlock;

a first multi-pass processing chamber coupled to the entry loadlock, the first multi-pass processing chamber having a sputtering magnetron arrangement and configured to house a single substrate carrier for performing a multi-pass processing;

a single-pass chamber coupled to the first multi-pass processing chamber and having a sputtering magnetron arrangement arranged along a carrier travel direction, the single-pass chamber configured to house multiple carriers arranged serially in a row and configured for a single-pass processing;

a second multi-pass processing chamber coupled to the single-pass processing chamber, the second multi-pass processing chamber having a sputtering magnetron arrangement and configured to house a single substrate carrier for performing a multi-pass processing; and

an exit loadlock chamber coupled to the second multi-pass processing chamber.

10. The system of claim 9, wherein each of the magnetron arrangements comprises a paired magnetron, each paired magnetron arranged serially in direction of processing, such that a traveling carrier moves past a first magnetron and then a second magnetron of the paired magnetrons.

11. The system of claim 9, wherein the sputtering magnetron arrangement of the single-pass chamber comprises a plurality of paired magnetrons, each paired magnetron arranged serially in direction of processing, such that a traveling carrier moves past a first magnetron and then a second magnetron of each of the paired magnetrons.

12. The system of claim 10, wherein the first magnetron and the second magnetron of the paired magnetrons comprise targets made of the same material.

13. The system of claim 11, wherein the first magnetron and the second magnetron of the paired magnetrons comprise targets made of the same material.

14. The system of claim 9, further comprising a transport mechanism moving carriers in the first and second multi-pass chambers independently of each other, while moving carriers in the single-pass chamber in unison.

15. The system of claim 9, wherein the single-pass chamber is configured such that a carrier placed within the single-pass chamber cannot be outside the cone of deposition of magnetrons within the single-pass chamber.

16. The system of claim 15, wherein each of the first and second multi-pass chambers is configured such that a carrier placed within the multi-pass chamber can be positioned outside the cone of deposition of magnetrons within the multi-pass chamber.

17. A sputtering system, comprising:

at least one multi-pass chamber configured to house a single substrate carrier;

at least one single-pass chamber coupled to the multi-pass chamber;

a transport mechanism transporting the plurality of substrate carrier within the single-pass chamber in unison at a first transport speed and transporting the single carrier within the multi-pass chamber in forward and reverse motions at a second speed faster than the first speed.

18. The system of claim 17, wherein the second speed is configured such that the single carrier in the multi-pass chamber traveling at the second process speed can perform at least two forward and one reverse passes during the time that a carrier in the single-pass chamber traveling at the first process speed performs one pass.

19. A sputtering chamber, comprising:

a vacuum chamber having an entrance slit and an exit slit enabling transport of a substrate carrier therethrough;

at least one magnetron arrangement provided in the vacuum chamber, the magnetron arrangement comprising two magnetrons arranged serially in travel direction of the substrate carrier;

a gas injector positioned to inject reactive gas between the two magnetrons;

wherein no gate valve is provided in the entrance slit and the exit slit.

20. The chamber of claim 19, wherein each of the two magnetrons comprise targets made of the same material as targets of the other magnetron.