CLAIMS

1. Injector (3) for a vacuum vapour deposition system, said injector comprising :

   - an injection duct suitable for receiving vaporized materials from a vacuum evaporation source (2), and
   - a diffuser (4) comprising a plurality of nozzles for diffusing said vaporized materials into a vacuum deposition chamber (5), each nozzle comprising a channel (13) suitable for connecting said injection duct to said deposition chamber (5),

   characterised in that said diffuser (4) has a spatially varying nozzle distribution.

2. Injector (3) according to claim 1, characterized in that said diffuser comprises at least two nozzles having different channel geometries.

3. Injector (3) according to claim 1 or 2, characterized in that said diffuser comprises at least three nozzles aligned along a longitudinal axis and having different spacings between two adjacent nozzles.

4. Injector (3) according to any of claim 1 to 3, characterized in that at least one of said nozzles comprise at least one removable diffuser insert (9), said diffuser (4) comprising diffuser insert receiving means and said diffuser insert (9) comprising attachment means (15) suitable for being fitted to said receiving means.

5. Injector (3) according to claim 4, characterized in that said diffuser insert (9) comprises at least an input aperture (11, 11a, 11b, 11c) at one end of said channel (13) emerging inside said injection duct and at least an output aperture (12) at another end of said channel (13) emerging outside said injection duct.

6. Injector (3) according to claim 4, characterized in that said diffuser comprises at least one diffuser insert (9c) suitable for obturating a nozzle.

7. Injector (3) according to any of claims 4 to 6, characterized in that said diffuser (3) receiving means comprise an internal thread and in that said diffuser insert (9) attachment means comprise an external thread (15) fitted to said diffuser internal thread.

8. Injector (3) according to any of claims 4 to 6, characterized in that said diffuser (3) receiving means comprise an external thread and in that said diffuser insert (9) attachment means comprise an internal thread fitted to said diffuser external thread.

9. Vacuum deposition system comprising a vacuum evaporation source an injector according to any one of claims 1 to 8 and a vacuum deposition chamber.

10. Process for calibrating an injector according to any of claims 1 to 8, comprising the following steps :

a) arrangement of a diffuser comprising a plurality of nozzles distributed along a longitudinal axis following an initial configuration ;

b) deposition of vaporized materials on a substrate using said diffuser in said initial configuration ;

c) measurement of a uniformity profile of said deposited materials ;

d) modification of the spatial distribution of said nozzles as a function of said measured uniformity profile, in order to reduce non-uniformity of deposited materials.

11. Process according to claim 10 which comprises repeated implementation of steps (b) to (d).

12. Process according to claim 10 or claim 11 wherein at least one of said nozzles comprises at least one removable diffuser insert and modification of the spatial distribution of said nozzles comprises a replacement of the removable diffuser insert by another removable diffuser insert.

13. Process for manufacturing a diffuser for an injector for a vacuum deposition system according to any of claims 1 to 8, comprising the following steps :

e) Manufacturing of an injector for a vacuum deposition system, said injector comprising a diffuser comprising at least a plurality of diffuser insert receiving means aligned along a longitudinal axis,

f) Manufacturing of a removable diffuser insert comprising attachment means suitable for being fitted to said receiving means of said diffuser,

g) Assembling said removable diffuser insert with said diffuser.

14. Process for manufacturing a diffuser for an injector for a vacuum deposition system, said process comprising the following steps :

(h) Providing an injector comprising a diffuser comprising an injection duct and at least a plurality of diffuser insert receiving means aligned along a longitudinal axis;

(i) Modelling the diffusion profile of a diffuser insert using diffusion flow models;

(j) Correcting the diffusion profile of a set of a plurality of inserts as a function of the respective positions of each insert along the longitudinal axis of said diffuser;

(k) Comparing the desired diffusion profile with the modelled diffusion profile of the set of diffuser inserts;

(l) Defining the diffuser insert distribution corresponding to the desired diffusion profile;

(m) Inserting diffuser inserts comprising attachment means suitable for being fitted to said receiving means of said diffuser into the corresponding receiving means.

CLAIMS

1. Injector (3) for a vacuum vapour deposition system, said injector comprising :

   - an injection duct suitable for receiving vaporized materials from a vacuum evaporation source (2), and
   - a diffuser (4) comprising a plurality of nozzles for diffusing said vaporized materials into a vacuum deposition chamber (5), each nozzle comprising a channel (13) suitable for connecting said injection duct to said deposition chamber (5),

   characterised in that said diffuser (4) has a spatially varying nozzle distribution wherein at least one of said nozzles comprises at least one removable diffuser insert (9), said diffuser (4) comprising diffuser insert receiving means and said removable diffuser insert (9) comprising attachment means (15) suitable for being fitted to said receiving means, and wherein at least one removable diffuser insert (9c) is suitable for obturating a nozzle.

2. Injector (3) according to claim 1, characterized in that said diffuser comprises at least two nozzles having different channel geometries.

3. Injector (3) according to claim 1 or 2, characterized in that said diffuser comprises at least three nozzles aligned along a longitudinal axis and having different spacings between two adjacent nozzles.

4. Injector (3) according to claim 1, characterized in that said diffuser insert (9) comprises at least an input aperture (11, 11a, 11b, 11c) at one end of said channel (13) emerging inside said injection duct and at least an output aperture (12) at another end of said channel (13) emerging outside said injection duct.

5. Injector (3) according to any of claims 1 to 4, characterized in that said diffuser (3) receiving means comprise an internal thread and in that said diffuser insert (9) attachment means comprise an external thread (15) fitted to said diffuser internal thread.

6. Injector (3) according to any of claims 1 to 5, characterized in that said diffuser (3) receiving means comprise an external thread and in that said diffuser insert (9) attachment means comprise an internal thread fitted to said diffuser external thread.

7. Vacuum deposition system comprising a vacuum evaporation source an injector according to any one of claims 1 to 6 and a vacuum deposition chamber.

8. Process for calibrating an injector according to any of claims 1 to 6, comprising the following steps :

a) arrangement of a diffuser comprising a plurality of nozzles distributed along a longitudinal axis following an initial configuration wherein at least one of said nozzles comprises at least one removable diffuser insert and wherein at least one removable diffuser insert (9c) is suitable for obturating a nozzle ;

b) deposition of vaporized materials on a substrate using said diffuser in said initial configuration ;

c) measurement of a uniformity profile of said deposited materials ;

d) modification of the spatial distribution of said nozzles as a function of said measured uniformity profile, in order to reduce non-uniformity of deposited materials.

9. Process according to claim 8 which comprises repeated implementation of steps (b) to (d).

10. Process according to claim 8 or claim 9 wherein modification of the spatial distribution of said nozzles comprises a replacement of the removable diffuser insert by another removable diffuser insert.

11. Process for manufacturing a diffuser for an injector for a vacuum deposition system according to any of claims 1 to 6, comprising the following steps :

e) Manufacturing of an injector for a vacuum deposition system, said injector comprising a diffuser comprising at least a plurality of diffuser insert receiving means aligned along a longitudinal axis,

f) Manufacturing of a removable diffuser insert comprising attachment means suitable for being fitted to said receiving means of said diffuser, wherein at least one removable diffuser insert (9c) is suitable for obturating a nozzle,

g) Assembling said removable diffuser insert with said diffuser.

12. Process for manufacturing a diffuser for an injector for a vacuum deposition system, said process comprising the following steps :

(h) Providing an injector comprising a diffuser comprising an injection duct and at least a plurality of diffuser insert receiving means aligned along a longitudinal axis;

(i) Modelling the diffusion profile of a diffuser insert using diffusion flow models;

(j) Correcting the diffusion profile of a set of a plurality of inserts as a function of the respective positions of each insert along the longitudinal axis of said diffuser;

(k) Comparing the desired diffusion profile with the modelled diffusion profile of the set of diffuser inserts;

(l) Defining the diffuser insert distribution corresponding to the desired diffusion profile;

(m) Inserting diffuser inserts comprising attachment means suitable for being fitted to said receiving means of said diffuser into the corresponding receiving means, wherein at least one removable diffuser insert (9c) is suitable for obturating a nozzle.