CLAIMS

1. A material deposition system for depositing material on an electronic substrate, the material deposition system comprising:

a frame;

a support coupled to the frame, the support being configured to support an electronic substrate during a deposit operation;

a gantry coupled to the frame; and

a deposition head coupled to the gantry, the deposition head being movable over the support by movement of the gantry, the deposition head including

a chamber configured to hold material,

an actuator configured to push a volume of material out of the chamber,

a needle extending from the chamber and terminating in a needle orifice, and

at least two air jets located on opposite sides of the needle orifice,

wherein a desired volume of material is formed at the needle orifice in response to the actuator, and

wherein each of the at least two air jets produce a timed pulse of air to create a micro-droplet from the desired volume and to accelerate the micro-droplet to high velocity.

2. The material deposition system of claim 1, further comprising a control system for synchronizing the timed pulse of air from the at least two air jets with the formation of the desired volume of material at the needle orifice by the actuator.

3. The material deposition system of claim 2, wherein the control system activates the at least two air jets prior to the formation of the desired volume of material at the needle orifice.

4. The material deposition system of claim 3, wherein the control system deactivates the at least two air jets after the creation of the micro-droplet.

5. The material deposition system of claim 1, wherein the material includes low viscosity and high viscosity materials.

6. The material deposition system of claim 5, wherein the micro-droplet is equal to or smaller than the needle orifice.

7. A method for depositing material on an electronic substrate, the method comprising:

positioning an electronic substrate under a deposition head movable by a gantry;

supplying material to a chamber of the deposition head;

extending a needle of the deposition head from the chamber, the needle terminating in a needle orifice;

pushing a volume of material out of the chamber with an actuator of the deposition head to form a desired volume of material at the needle orifice;

locating at least two air jets on opposite sides of the needle orifice; and

producing a timed pulse of air to create a micro-droplet from the desired volume and to accelerate the micro-droplet to high velocity to deposit the micro droplet.

8. The method of claim 7, further comprising synchronizing with a control system the timed pulse of air from the at least two air jets with the formation of the desired volume of material at the needle orifice by the actuator.

9. The system of claim 8, further comprising activating the at least two air jets prior to the formation of the desired volume of material at the needle orifice.

10. The system of claim 9, further comprising the step of deactivating the at least two air jets after the creation of the micro-droplet.

11. The method of claim 7, wherein the material includes low viscosity and high viscosity materials.

12. The method of claim 11, wherein the micro-droplet is equal to or smaller than the needle orifice.

13. A material deposition system for depositing material on an electronic substrate, the material deposition system comprising:

a frame;

a support coupled to the frame, the support being configured to support an electronic substrate during a deposit operation;

a gantry coupled to the frame; and

a deposition head coupled to the gantry, the deposition head being movable over the support by movement of the gantry, the deposition head including

a chamber configured to hold material,

an actuator configured to push a volume of material out of the chamber,

a needle extending from the chamber and terminating in a needle orifice, wherein a desired volume of material is formed at the needle orifice in response to the actuator, and

means, located on opposite sides of the needle orifice, for producing a timed pulse of air to create a micro-droplet from the desired volume and to accelerate the micro-droplet to high velocity.

14. The material deposition system of claim 13, further comprising a control system for synchronizing the timed pulse of air with the formation of the desired volume of material at the needle orifice by the actuator.

15. The material deposition system of claim 14, wherein the control system activates at least two air jets prior to the formation of the desired volume of material at the needle orifice.

16. The material deposition system of claim 15, wherein the control system deactivates the at least two air jets after the creation of the micro-droplet.

17. The material deposition system of claim 13, wherein the material includes low viscosity and high viscosity materials.

18. The material deposition system of claim 17, wherein the micro-droplet is equal to or smaller than the needle orifice.

CLAIMS

1. A method for cleaning a nozzle of a material deposition system configured to deposit material on an electronic substrate, the method comprising:

performing a deposition operation with a material deposition system configured to position an electronic substrate under a deposition head movable by a gantry, to supply material to a chamber of the deposition head, to extend a piston of the deposition head from the chamber, the deposition head having a needle terminating in a needle orifice, and to push a volume of material out of the chamber by an actuator of the deposition head to form a desired volume of material at the needle orifice that is deposited on the electronic substrate; and

cleaning the needle orifice with air directed to the needle orifice,

wherein cleaning the needle orifice includes positioning at least two air jets on opposite sides of the needle orifice and producing a pulse of air directed to the needle orifice.

2. The method of claim 1, further comprising synchronizing the timed pulse of air from the at least two air jets to clean the needle orifice.

3. The method of claim 1, wherein the material includes low viscosity and high viscosity materials.

4. The method of claim 3, wherein a micro-droplet dispensed through the needle orifice is equal to or smaller than the needle orifice.

5. A method for cleaning a nozzle of a material deposition system configured to deposit material on an electronic substrate, the method comprising:

performing a deposition operation with a material deposition system configured to position an electronic substrate under a deposition head movable by a gantry, to supply material to a chamber of the deposition head, to extend a piston of the deposition head from the chamber, the deposition head having a needle terminating in a needle orifice, and to push a volume of material out of the chamber by an actuator of the deposition head to form a desired volume of material at the needle orifice that is deposited on the electronic substrate;

cleaning the needle orifice with air directed to the needle orifice; and

positioning the deposition head over a collection cup when cleaning the needle.

6. The method of claim 5, wherein the collection cup is placed on a movable slide.