CLAIMS

1. A method of electroplating, the method comprising:

delivering a current from a power supply through a plating bath of an electroplating chamber for a first period of time, wherein the current delivered comprises a pulsed current at a duty cycle of less than or equal to 50%;

plating a first amount of metal on a substrate within the plating bath, wherein the substrate defines a via within the substrate;

subsequent to the first period of time, transitioning the power supply to a continuous DC current delivery for a second period of time; and

plating a second amount of metal on the substrate,

wherein a peak current density during the first period of time is greater than a peak current density during the second period of time.

2. The method of electroplating of claim 1, wherein the current delivered during the first period of time is characterized by an operational frequency of less than or equal to 1,000 Hz.

3. The method of electroplating of claim 1, wherein an average current density during the first period of time is less than or equal to 3 mA/cm^2.

4. The method of electroplating of claim 3, wherein an average current density during the second period of time is greater than or equal to the average current density during the first period of time.

5. The method of electroplating of claim 4, wherein a peak current during the second period of time is less than or equal to 2 Amps.

6. The method of electroplating of claim 5, wherein a peak current during the first period of time is greater than or equal to 2 Amps.

7. The method of electroplating of claim 1, wherein, during the second period of time, average current density is increased over time.

8. The method of electroplating of claim 1, wherein the via defined within the substrate is characterized by a depth of greater than or equal to 10 µm.

9. The method of electroplating of claim 1, further comprising:

a barrier layer formed along walls of the via defined within the substrate.

10. The method of electroplating of claim 9, wherein the barrier layer comprises one or more of tantalum or titanium, and wherein the metal deposited comprises copper.

11. A method of electroplating, the method comprising:

delivering a current from a power supply through a plating bath of an electroplating chamber for a first period of time, wherein the power supply is operated during the first period of time in a pulsed DC delivery at a frequency of less than or equal to 750 Hz;

plating a first amount of copper on a substrate within the plating bath;

subsequent to the first period of time, transitioning the power supply to a continuous DC current delivery for a second period of time; and

plating a second amount of copper on the substrate,

wherein a peak current density during the first period of time is greater than a peak current density during the second period of time.

12. The method of electroplating of claim 11, wherein an on-time during the first period of time for each pulse is less than or equal to 100 ms.

13. The method of electroplating of claim 11, wherein, during the first period of time, the power supply is operated at a duty cycle of less than or equal to 20%.

14. The method of electroplating of claim 11, wherein an average current density during the first period of time is less than an average current density during the second period of time.

15. The method of electroplating of claim 11, wherein the peak current density during the first period of time is greater than or equal to two times the peak current density during the second period of time.

16. The method of electroplating of claim 11, wherein the substrate defines a via characterized by a depth-to-width ratio greater than or equal to 10.

17. The method of electroplating of claim 11, wherein the via is lined with a barrier layer and a seed layer of copper.

18. The method of electroplating of claim 11, wherein, during the second period of time, average current density is ramped in a set of plating operations.

19. A method of electroplating, the method comprising:

delivering a current from a power supply through a plating bath of an electroplating chamber for a first period of time, wherein the power supply is operated during the first period of time in a pulsed DC delivery at a frequency of less than or equal to 1000 Hz at a duty cycle of less than or equal to 50%;

plating a first amount of copper on a substrate within the plating bath, wherein the substrate defines a via lined with a barrier layer and a seed layer of copper, and wherein the first amount of copper plated is characterized by a thickness of less than or equal to 500 nm;

subsequent to the first period of time, transitioning the power supply to a continuous DC current delivery for a second period of time greater than the first period of time; and

plating a second amount of copper on the substrate,

wherein a peak current density during the first period of time is greater than a peak current density during the second period of time.