Electrochemical Deposition Method Utilizing Microdroplets of Solution

Abstract

Boise State University has invented a process to reduce waste, cost and the time required to prepare thin films from certain materials. This process uses minimal (sub-micro liter) volumes of plating solution and eliminates the necessity for photolithography and etch steps in the creation of integrated circuit components from these materials.

The invention is a process of selectively depositing a thin film of material on a conductive substrate. It is especially useful for forming thin films on components of printed electronic microchips or circuits. A very small droplet (~400 nanoliters) of a conductive solution with the deposition material in it is placed on an electrically conductive component. A current is passed through the solution between a probe inserted in the droplet and another probe in electrical contact with the conductive substrate. Current between the two probes causes thin film deposition of the plating material on any surface that is both (a) in physical contact with the plating solution and (b) in electrical contact with the conductive substrate. This process reduces waste compared to standard electroplating techniques and eliminates the need for photolithography and etch steps to build these specific types of components. This in turn greatly decreases the cost, time and complexity of preparing these thin film components.

Advantages

- Any material that can be electroplated on a conductive substrate could be used.
- The process uses very low volume of plating solution, therefore reducing cost and waste.
- Deposits a thin film only where needed without mask, photolithography and etch steps.
- Film thickness and other film properties can be varied by changing the plating solution.
- Different films can be deposited on different sites, without masking.
- The method is readily automated via robotics.

Stage of Development

This technology is developed and a patent has issued.

Boise State is looking for a Licensee for this technology.

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