



BULCON: Electrochemical Metal Oxide deposition for substrates with Bulk Conductivity

Technology

BULCON is a first of its kind electrochemical deposition tool designed for application of metal oxide coatings on solid substrates with bulk electrical conductivity including but not limited to ***n⁻ or p⁺ type silicon wafers*** or metals such as ***nickel, silver, copper etc.*** BULCON can be used for deposition of a wide variety of metal oxide coatings including but not limited to ***ZnO, Al₂O₃, In₂O₃, CdO, Y₂O₃, WO₃, ZrO₂, and SnO₂.***

BULCON is designed for single sample processing of substrates up to 15cm x 15cm in total surface area and is perfectly suited for laboratory level deposition of metal oxide coatings.

BULCON is further unique in its ability to deposit coatings on a single side of a substrate without masking.

Applications

BULCON can be effectively used as an R&D metal oxide deposition tool in a wide variety of technology development and research applications including but not limited to the following:

- Antireflective optically transparent coating with adjustable values of reflection and refractive index
- Surface passivation coatings for semiconductor devices
- Masking of patterned integrated circuits
- Index matching coatings
- Coatings with high electrical insulation values with a very high degree of control over the coating's thickness and roughness
- Development & testing of new materials with advanced conductive, dielectric, optical and other properties.

Features

BULCON has a number of unique features including the following:

- Single side deposition without masking
- All parameters of coating process are adjustable including deposition process temperature, galvanostatic electrical parameters, time and chemistry
- The same deposition tool can be used for coating p and n type semiconductor substrates
- Deposited film thickness can be easily adjusted with +/- 2% uniformity over a wide range up to 200nm and greater
- Deposition process can be adjusted to provide for desired levels of porosity and refractive index of metal oxide coatings
- Substrate dimensions up to 15cmx15cm
- Crystalline film structure
- Low electrolyte working volume (less than 30ml)
- Compatible with both Organic or Aqueous electrolytes
- Applicable for deposition of a wide range of metal oxide films including ZnO, Al₂O₃, In₂O₃, CdO, Y₂O₃, WO₃, ZrO₂, SnO₂ etc.
- Galvanostatic process with a wide range of operating electrical currents tunable to your specific electrolyte and metal oxide system (0.5mA/cm² up to 1A/cm²) *Note: specific current range subject to power supply used.*
- Enables electrochemical control for valence state of deposited metal oxide system
- Coating speed is about 1 minute per 15cm x 15cm in total surface area

Advantages

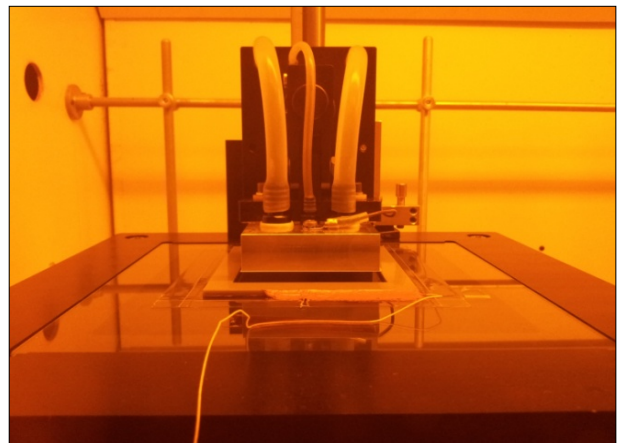
BULCON is a direct replacement of a more traditional PVD, CVD, PECVD and/or APCVD-based approach to metal oxide film deposition. As a PVD replacement BULCON offers a number of advantages:

- BULCON is an atmospheric pressure deposition tool. As a result BULCON is a lot simpler, cheaper and easier to both install and operate
- BULCON deposition process takes place at <80°C temperature and results in deposition of metal oxide films with crystalline structure. As a result BULCON does not generally require post-deposition high temperature annealing and is well suited for processing of temperature sensitive substrates.
- BULCON utilizes wet pre-clean process for incoming substrates. This process does NOT result in any damage to the substrate surface prior to deposition.
- BULCON utilizes over 98% of deposition materials and is capable of deposition chemistry changes without any equipment adjustments or downtime.
- BULCON has very low power consumption that is as low as 0.05-0.07Wh/substrate in case of deposition on silicon wafers.

Benefits

Key benefits of using BULCON as a part of laboratory research include:

- Accelerated technology development cycle due to simple, flexible and low cost approach to metal oxide deposition offered by BULCON R&D equipment
- Ability to deposit metal oxide coatings on a single side of a substrate without substrate masking and subsequent mask removal
- Low deposition process temperature broadens the universe of substrate materials as well as simplifies integration with low temperature earlier processing steps
- Lack of substrate damage during the wet pre-clean process enables higher level optical properties



Horizontal deposition alignment with transparent counter electrode for substrate illumination.

Contact Worldwide:

Clear Metals Inc.

lrubin@clearmetalsinc.com

6-1225 East Keith Rd, North Vancouver, BC
Canada V7J 1J3
Tel: +1.604.551-2578

Web: www.clearmetalsinc.com

Contact Europe:

SemiMetrics Ltd.

eric.don@semimetrics.com

PO Box 36, KINGS LANGLEY
WD4 9WB United Kingdom
Tel: +44 1923 290000

Web: www.semimetrics.com