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Vaksis Vacuum Systems Bulletin
Year: 2, No: 6, December 2012

PVD AND CVD COATING SYSTEMS FOR VARIOUS APPLICATIONS

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■ thin film coatings
by using vapor
deposition

■ new product

RIE-*handy*

■ activities

- PVD: Physical Vapor Deposition
- CVD: Chemical Vapor Deposition

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Thin film coatings by using vapor deposition

I can say that thin film is so important in today's technology. Thin film structures have wide range of application like mobile phones, LED screen, photovoltaic solar energy panels, modern window glass, camera, pressure sensor at car wheels. Well, what is thin film? We can clarify the meaning by explaining words more deeply. First of all, we should ask ourselves what is the film.

Film comes to our life with the objects like photograph film, cinema film and stretchable plastic films (stretch films in our language) which we used at food keeping. Common traits of these objects that they are thin layer relatively. Think that we can coat the materials with no space between layers, we create thin film coated surfaces. When we dye the metal material thinly, we coat it with thin layer. If we are removed this dye as a layer, dye layer comes to our hand as a film.

At that point, the question is why we add "thin" as an adjective to film which is already thin. Because, in our daily life we do not find the films are thin enough. Although there is no standard in thickness limitation, in our daily life, the layers what we mentioned as a film are 10-300 micrometer. If we spread this film layer on a material's surface, this layer is called "coating". When the film layer takes an adjective as a "thin", generally the thicknesses are range from a few atom layer thickness (e.g. 1 nanometer) to 200-250 atoms layer thickness (e.g. 1000 nm). Some physicists use "thin" term for films which are between soft x-ray wavelength and near infrared wavelength. Descriptions can change according to the user's application. Reader understood thickness range of the thin films.

Because of these atomic thicknesses, generally it is not possible that the controlled production of such thin layers with "coating" production techniques. Thus, new techniques need to be developed for thin film production. New technique is based on the ground of deposition of atoms or molecules on a surface in a controlled manner. For deposition, the methods of atoms' (or molecules') preparations make different thin film deposition techniques each other. The personnel who works for this subject can classify these techniques successfully. Though, sometimes these classes can be mixed up each other but still certain two groups are accepted by everyone over the years.

These groups are known as a) physical vapor deposition and b) chemical vapor deposition.



Dr. Baybars ORAL
COMPANY MANAGER

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new product

RIE-handy

RIE: Reactive-ion Etching

THIN FILM ETCHING SYSTEM BY REACTIVE ION ETCHING TECHNIQUE

Very small electronic circuit is generally produced with VLSI (Very Large Scale Integration) technology by using thin film structures. Nearly billion circuits on a chip are obtained with this technology. The most known application is like that: the required materials of circuit's structures (extrinsic or intrinsic semiconductors, metals, insulators, etc.) are generally coated as a thin film on a silicon (Si) substrate using PVD and/or CVD techniques. But, covering with film layer of all the surface makes impossible producing VLSI circuit. For this reason, some of the thin film layers are removed from the surface –as leaving a structure behind- in a controlled manner. Another layers are coated on the residual structure. And then, they are also removed again as leaving a structure behind. VLSI is achieved after applying these procedures in sequence.

As mentioned above, removing thin films from the surface as leaving a structure behind procedure is called "etching". If this etching process is executed by the ion crashing in vacuum, this is called "ion etching". If crashed ions have some reactive gas ions and these kind of ions accelerate the etching by reacting with thin films, this is called "reactive ion etching" (RIE).

Vaksis is the first producer company of RIE system in Turkey with your support in 2012.

CONTROL AND USAGE

Pumps, pressure gauge units, mass flow control units, valves, RF power supply are controlled by electronically. In this system, etching parameters work by software and control automatically with saved protocols. Advantage of this software is you can save gas flow amounts, pressure values, RF power values and examine the process of the etching.



Technical Specifications

Base pressure: $< 5 \times 10^{-6}$ Torr
High Speed Pump: Turbo pump
Backing Pump Mechanical pump
Substrate size: 6" diameter
Substrate cooling: < 50 °C
Power generator: RF, 13.56 MHz
Number of gas flow controller: 8
Loading: From top
Control: Full automation by PC

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which we attended...



27th European Photovoltaic Solar Energy
Conference and Exhibition, Frankfurt-Germany
(25-28th September 2012)

www.photovoltaiic-conference.com
www.photovoltaiic-exhibition.com

Vaksis was an organization sponsor and met with the relevant participant during the activity.



SOLARTR-2 Solar Energy Conference and
Exhibition, Antalya Dedeman
(7-9th November 2012)

<http://www.solartr.org/index.html>

SOLARTR-2 Solar Energy Conference and Exhibition was held in Antalya successfully.

Vaksis was an organization sponsor and met with the relevant participant during the activity.



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