

# CIGS Thin Film Deposition System



*A Leader in the Innovation,  
Design and Production of  
Solar Thin Film Technology*



*Engines for Thin Film Innovation*

## CIGS Thin Film Deposition System

SVT Associates has been innovating thin film deposition technology for more than 15 years. With the unique combination of equipment design and an on-site application laboratory, SVT Associates has the process knowledge to provide the best solution for your application. Offering scalable solutions, the teams of experienced design experts and scientists treat each customer's request as an individual engineering project. When choosing SVT Associates as your thin film deposition equipment supplier, you will receive the support and service your project deserves. SVT Associates CIGS thin film deposition platform offers proven solutions for CIGS absorber layer and CdS buffer layer deposition. From research to full scale production our products are engineered for highest throughput, uniformity and material quality.

## CIGS Thin Film Research Deposition System

The model 35-V-100 mm is a dedicated Thin Film Deposition tool designed to handle 100 mm square substrates for CIGS research and development.

- Storage for up to 6 samples
- Robust high temperature substrate heater
- Multiple pumping combinations available including Se trap
- Versatile system module configurations including sample characterization
- Substrate handling options include a cluster tool for future expansion
- Up to ten deposition sources



*Model 35-V-100 mm Deposition System*

## CIGS In-Line Pilot Deposition System

The model SVTA-CIGS-30 is a turnkey in-line deposition system for absorber layer deposition on 300 mm square substrates. It can be configured for single, and multi stage deposition using thermal evaporation sources or as pure selenization module.

- Substrate size up to 300 mm square
- Fully controlled conveyor system
- Substrate parking inside each linear deposition module
- Linear PV series thermal evaporation sources
- Selenization module and RTP capability
- Advanced in-situ metrology tools for precise deposition and temperature control



*Model SVTA-CIGS-30 In-Line Pilot Deposition System*



*Part of the NREL PV line*

## PV Series - Thin Film Deposition Sources

The PV series deposition sources offer high performance thermal evaporation of copper, Indium, gallium, and selenium for research and development systems.



*Thermal Evaporation Source*

### THERMAL EVAPORATION SOURCES

- Sizes from 2 cc to 500 cc
- Temperature from 150 °C – 2,000 °C
- Low shutter transients
- Optional integral shutter
- Optional integral cooling shroud

### S/SE VALVED CRACKING SOURCE

- High purity crucible and cracking zone
- Full valve control
- Easy filling and operation
- Efficient, reliable and ultra-pure flux
- Optional in-situ flux monitoring



*Se Valved Cracking Source*

## PV Series - Production Sources

The PV series production sources offer large capacity and high material utilization for demanding in-line and batch systems of large substrates of up to 1,200 mm x 1,200 mm.

PV Series low COO and high MTBF make them the best choice for pilot lines and full scale production.

### S/SE VALVED EVAPORATION SOURCE

- 10,000 and 30,000 cc capacity
- Uniformly heated multi-aperture injector
- Thermal cracking head for partial dissociation
- Motor driven needle valve controls flux
- Reliable control of "Mixed-VI" Se/S ratios
- Uniformly heated large volume crucible
- Top filling port for fast refill



*S/Se Valved Evaporation Source*



*PV Point Source*

### PV POINT SOURCE SERIES

- 200 cc – 2,000 cc source capacity
- Temperature to 1,600 °C
- Highly controlled deposition rates
- Uniform deposition over large areas

### LINEAR SOURCE SERIES

- Up to 8,000 cc capacity
- Designed for uniform material distribution in in-line configurations
- Tailored and user replaceable flux distribution (200, 300, 600 mm substrate size, larger on request)
- High material utilization



*Linear Source*

## PV Series Metrology and Process Control

SVT Associates Metrology Solutions for substrate temperature and deposition control provide optimum process reliability and yield. They can be fully integrated into any process control system.



*AccuTemp Process Monitor*

### ACCUTEMP™ PROCESS MONITOR

- Real-time measurement of wafer temperature
- Bandedge based add-on module for low temperatures and composition control
- Dual wavelength for window coating compensation and optimum process fit
- Closed-loop control
- Reflectance monitoring for endpoint detection

### ACCUFLUX™ PROCESS MONITOR

- Optical flux sensing of copper, indium and gallium
- Adjustable sensitivity for large flux range (0.01 to 1000  $\mu\text{m/hr}$ )
- Composition control better 1%
- Closed-loop flux/thickness control



*AccuFlux Process Monitor*

## Chemical Bath Deposition System

SVT Associates model CBD-CdS-100/300 Deposition System provides a cost effective platform for the controlled deposition of CdS as buffer layer and n-type junction of a CIGS device structure.

- Turnkey platform includes formulations and bath control as well as brush cleaning, rinsing and drying stations
- All solution containers are flow thru reactors refreshing chemicals for highest homogeneity and reliable process results
- Manual and automatic substrate handler systems for automation and safety
- System is scalable for glass and flexible substrate sizes between 100 mm and 300 mm
- Embedded controller with an easy user interface controlling solution treatment, waste chemical handling, process automation and data logging

