NOVACENTRIX®

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PulseForge® 3300 Photonic Curing Tool

Printed Electronics Manufacturing

Semiconductor and Photovoltaic Materials

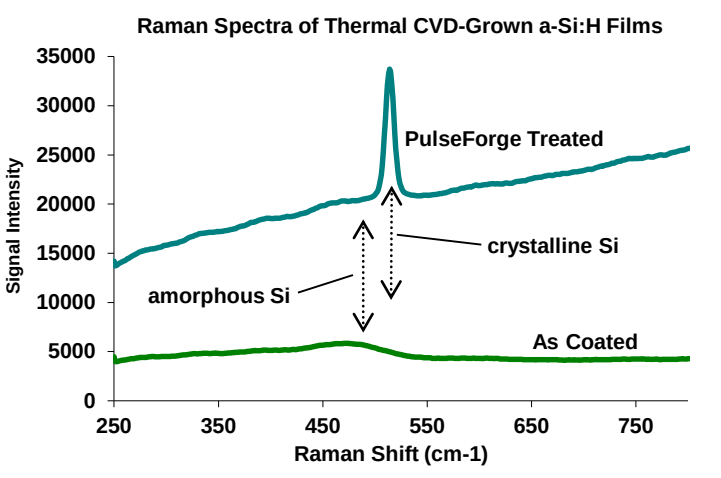
PulseForge 3300 depicted in 150 mm process width integrated with conveyor material-handling system

Overview

The NovaCentrix PulseForge 3300 is designed for processing printed semiconductor and ceramic inks and thin-film materials on low-temperature substrates. Applications include printed photovoltaics, displays, logic, and batteries. The PulseForge 3300 is designed for roll-to-roll and conveyor-based material processing, and is ideal for full-volume production as well as application development. The PulseForge 3300 is CE mark certified for sale in EU countries.

Designed for Printed Electronics: Semiconductors and Photovoltaics

The PulseForge 3300 processes semiconductor and ceramic materials such as those required for printed displays, photovoltaics, logic, thin-film batteries, and capacitors. The tools create the very high processing temperatures required for recrystallization and annealing, without damaging adjacent low-temperature polymeric substrates or organic materials. This is accomplished using ultra-high-intensity lamps at very short pulse durations.



The PulseForge 3300 converts a 200nm a-Si thin-film on borosilicate glass to μ-crystalline Si.

Power Delivery

The PulseForge 3300 commercial processing tool delivers a peak power of up to 35 kW/cm^2 to your product in a wide-web format – widths from 150 mm (6″) to greater than 4 m (157″). The tool is auto-synchronized to line speeds from 1 to over 100 meters/minute (300 FPM). The high pulsed power is required to achieve very high temperatures in the semiconductor film without damaging the underlying low-temperature substrate; e.g. plastic film.

Pulse Waveform Shaping

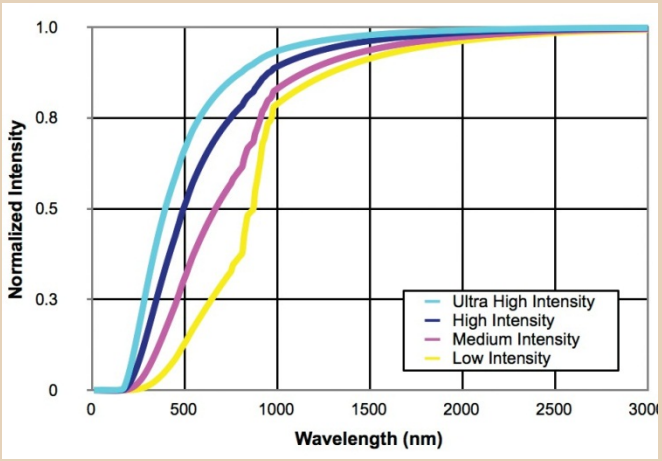
The PulseForge 3300 achieves *high-temperature processing on low-temperature materials*™ using pulse-width modulated light with exposures as short as 30 microseconds. This is accomplished using precise real-time control of the current delivered to proprietary lamps. The pulse duration and energy waveform can be adjusted on-the-fly by feedback on product processing and performance sensors.

Pulse Rate

For high-rate roll-to-roll processing, the pulse rate directly determines the amount of material that can be produced. The PulseForge 3300 has a maximum pulse rate in excess of 1 kHz enabling production speeds compatible with almost any printed electronics application – up 100 meters/min.

Pulse Spectrum

The emitted spectrum extends from the UV (200 nm) to the near IR (1000 nm). The pulse conditions can be changed, however, to shift the emission spectrum to favor either red or blue, even without filtering. As a result, the PulseForge 3300 can deliver as much as 50% of the pulse energy below 400 nm, or as little as 5%.



The PulseForge 3300 integrated emission spectrum for various pulse intensities

SimPulse™ Thermal Simulation Software

Developed especially for PulseForge tools and applicable to all thermal processing methods, this integral package is an invaluable design tool for predicting processing results.

Sample Processing by Request

Contact NovaCentrix to arrange to have your application materials processed by a PulseForge 3300, or other PulseForge tool, at our facility.

Contact us today to learn more:

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