



## Rate Stability with an OLED I Furnace

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The rate at which any material deposits will be affected by several factors including the crucible and liner used, the furnace temperature, as well as the furnace power in some cases. Most notably, quartz crucibles are largely transparent to IR radiation and thus pass heat to the source material without much heating of the crucible; in this case the thermocouple will respond much slower to an increase in power than the deposition rate. However, for most crucible/material combinations the deposition rate is directly proportional to the crucible temperature and can thus be accurately controlled with the temperature controller included in our Power Controller II Series.

For applications where rate must be very accurately controlled, or held constant for long periods of time we recommend using our Power Controller II+ with rate input from your deposition controller. Our power controllers can automatically adjust the furnace temperature to respond to changes in deposition rate in order to keep your process running smoothly. For a detailed example of configuring your Power Controller for automation, please see the document titled "Controller Automation IIP.pdf" available on our website.

In response to a customer's inquiry we tested the deposition rate stability that we could achieve using an OLED I furnace depositing copper phthalocyanine (CuPC). The rate information was recorded from an Inficon IC5 deposition monitor, temperature information and control performed using a Eurotherm 2704 temperature controller. Data was logged via Eurotherm iTools (a free software interface for our Power Controller II series). The system was configured with an OLED I furnace, Luxel "Organic" crucible, QCM rate monitor, and witness substrate. Both the QCM and witness substrate were located ~11" above the source.

The crucible was filled approximately 1/2 full with copper phthalocyanine and installed in the system. The system was evacuated to  $<5 \times 10^{-6}$  Torr, and the source heated to ~430C at 50C/sec. Source temperature was maintained manually to control rate for a reported (IC5) total "raw" thickness of 505nm. Post deposition, the furnace was allowed to cool to <100C then the chamber was vented and opened. The witness sample thickness was measured as 600nm via DekTak 3st surface profilometer.



## Product Datasheet: OLED I Rate Stability

Rev 2.1



Results are given the table and figure below. As the figure shows, the temperature was very gradually increased in order to keep the rate extremely steady (less than a tenth of an angstrom/second change).

	Rate (Å/Sec)
Mean	1.296
Standard Error	0.000171
Median	1.296
Mode	1.299
Standard Deviation	0.0098
Sample Variance	6.2E-05
Range	0.0726
Minimum	1.268
Maximum	1.304



## Product Datasheet:

