

## **NanoGram finds VC for silicon thick-film PV**

**April, 2008: NanoGram Corp., a San Francisco Bay Area developer of nano-scale materials and processes for optical, electronics and solar energy products, is planning to build a 3 to 5 MW pilot manufacturing line by early 2009 for PV modules based on its patent-pending method for large-area, thick-film deposition of multicrystalline silicon.**

In January, the company received \$32 million in venture capital – its third round of VC funding to date – from the Masdar Clean Tech Fund, Nth Power, Rockport Capital Partners, Technology Partners and others. In total, the company has raised nearly \$60 million. Currently, about one-third of NanoGram's 70 employees are working on the silicon thick-film project.

NanoGram uses a Laser Reactive Deposition (LRD) manufacturing process, originally developed for producing glass films, to deposit a 30 µm thick-film made of relatively large multicrystalline silicon grains onto a high-temperature ceramic substrate. The process uses crystal grains that are more than 2,000 times larger than in hybrid micromorph crystalline thin films and produces films that are 20 to 30 times thicker than thin-film PV based on amorphous silicon or cadmium telluride.

»We are essentially doing large-area deposition like thin films – but with thicker, higher-efficiency film,« says Ron Mosso, who leads the technical effort at NanoGram. The company is already producing laboratory films and is ambitiously targeting commercial efficiencies from 13 percent to greater than 15 percent at a cost structure »well under \$1 per W.«

According to CEO Kieran Drain, NanoGram plans to have the pilot line up and running at a space adjacent to the company's current facility in Milpitas by the first quarter of 2009. The line will produce modules for testing and initial field applications. Drain plans to seek additional fundraising next year to build volume production in 2010. »Clearly, the goal for us is to learn everything we can and prove the robustness of the process and the product so that in 2010, plants with a capacity of 50 MW and upwards can be a reality,« he says.