Midsummer develops high-efficiency process for cadmium-free CIGS on stainless steel by sputtering

[Stockholm, Sweden, November 12, 2013.] **Midsummer** <http://www.midsummer.se/>**, a leading supplier of production lines for cost effective manufacturing of flexible thin film CIGS solar cells, has developed a high speed process for manufacturing of CIGS solar cells utilising sputtering of all layers in the solar cell structure. Midsummer recently achieved a 15 per cent active area efficiency on an entire 225 cm2 solar cell using this sputtering technology.**

By using sputtering in all processing steps, the process cycles in the manufacturing of solar cells can be drastically shortened, the solar cells can be made cadmium-free and also made on stainless steel substrates suitable for flexible modules – all contributing to a highly competitive method to manufacture thin film CIGS cells with high efficiencies.

The process is a completely dry process and also an all-vacuum process, with less stringent requirements for clean-rooms etc.

"Most photovoltaic experts consider thin film flexible solar modules to be the future of solarenergy, and I agree," said Sven Lindström, CEO, Midsummer. "Our unique process makes thin film CIGS solar cells even more commercially attractive by making it possible to manufacture solar cells fast, efficiently and cost effectively even in small volumes."

To prove the potential of the technology, Midsummer recently made Cd-free CIGS cells with 15.0 per cent active area efficiency on the entire solar cells, sized 225 cm2. The solar cells were made on stainless steel substrates, stamped out from 0.3 mm thick ordinary ferritic stainless steel. One key achievement is the fact that the buffer layer was sputtered – normally it is deposited with chemicals or by atomic layer deposition. Also, theCIGS layers were sputtered from compound CIGS targets resulting in a very short cycle time (eliminating the need for selenizing the solar cells for several hours).

Using Midsummer's revolutionary solar cell manufacturing process by sputtering, solar cells can be made on stainless steel – suitable for flexible modules – and without any cadmium in the buffer layer. Cadmium and its compounds are highly toxic and exposure to this metal is known to cause cancer and other illnesses. Avoiding cadmium in the manufacturing process is desirable for the sake of the production staff and it makes it generally easier to commence

manufacturing of thin film CIGS solar cells.

Midsummer is a Swedish company with its roots in the optical disc manufacturing equipment and the photo mask industries. With expertise in utilizing sputtering for fast and efficient manufacturing processes, Midsummer has developed production lines for highly efficient and cost effective manufacturing of flexible thin film CIGS solar cells.

The company's DUO <http://www.midsummer.se/sida1.html> turn-key system is a scalable and compact manufacturing system for solar cells with a 5 MW annual production capacity. The heart of Midsummer's photovoltaic production system, the Duo line is a sputter tool that deposits all the layers forming the finished cell. The Midsummer DUO Line is the most cost effective way to start CIGS (copper,indium, gallium and selenide) solar cell manufacturing.

Midsummer's CIGS cells looks like crystalline silicon solar cells, but are made on stainless steel substrates. This makes the cells suitable not only for regular solar panels, but also for flexible, light weight panels that can be used on membrane roofs, landfills or other structures where the traditional glass modules cannot beapplied.