

Media release

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Flisom closes 4th financing round

With pilot plant inaugurated, Swiss PV start-up Flisom ready to take off

At today's inauguration of its pilot production plant near Zurich, Swiss start-up Flisom who develops innovative technologies for manufacturing flexible low-cost, high-performance thin film solar cells based on CIGS (copper-indium-gallium-(di)selenide) secured another substantial investment following an earlier investment of CHF 42.5 million just two years ago. With its roll-to-roll manufacturing the company is capable of producing 1 meter-wide rolls – an unprecedented capacity. A long-standing research cooperation between Flisom and Empa, the Swiss Federal Laboratories for Materials Science and Technology, was the basis for this successful scale-up from lab to industrial levels.

The figures are impressive: from 15 to 50+ employees in just over 1.5 years, a brand-new 4'500 m² pilot production plant in Niederhasli near Zurich with a production capacity of 15 MW (megawatts) in solar energy and another financing round of CHF 10 million. That's, in a nutshell, Flisom's development in the last two years, culminating in the pilot plant's inauguration on 11 June in the presence of Swiss State Secretary for Education, Research and Innovation, Mauro Dell'Ambrogio, and the President of the Government Council of the Canton Zurich, Ernst Stocker. The company, which started out as a ETH Zurich spin-off in 2005 and grew to its current size at Empa's technology center glaTec in Dübendorf, is developing roll-to-roll production technologies for low-cost, high-performance CIGS thin film solar cells on flexible plastic foil.

A veteran in thin film photovoltaics with 35 years of experience, Flisom founder (and Head of Empa's «Thin Film and Photovoltaics» lab) Ayodhya N. Tiwari is convinced that these cells have great potential for providing highly efficient solar modules and solar systems with low installation costs. Development trends and technological progress for CIGS technology suggest the feasibility of solar module costs below € 0.35/Wp (Watt peak) and installed system costs below € 0.6/Wp in the near future. Potential markets and applications for Flisom's flexible solar module manufacturing technology include utility scale solar farms,

building integrated photovoltaics (BIPV), building applied photovoltaics (BAPV), transportation and portable power – and thus a thus far untapped market potential of several billion Euros.

A long-standing partnership

With his Empa team, Tiwari is investigating fundamental properties of CIGS solar cells, a work that has thus far yielded a series of world records in energy conversion efficiency, from 12.8% in 1999 to 20.4% in 2013 – a value that now equals the highest efficiencies for polycrystalline silicon wafer-based solar cells. Combining Empa's world-class CIGS processing knowhow with Flisom's proprietary laser patterning tools meanwhile led to the production of a monolithically interconnected mini-module on plastic film, 5x5 cm² in size and with an overall efficiency of 16.9%. This progress suggests, says Tiwari, that « large area modules on flexible foils with an efficiency above 17% are very well possible with this technology».

Empa and Flisom have been cooperating for a number of years to develop a unique industrial-scale production platform for CIGS solar modules. «Scale-up for large-area solar modules and adapting these complex innovative processes for industrial manufacturability is quite a challenge and requires close collaboration between research labs and industrial partner for transferring research excellence to industrial usability», says Pierangelo Groening, head of the Department of Advanced Materials and Surfaces and member of Empa's Board of Directors. «For industrial partners such as Flisom we provide support on different topics to enable industrial development of novel and innovative concepts, which often require sophisticated analytical tools and skilled experts.» And Empa CEO Gian-Luca Bona adds: «We are pleased that Empa's innovations in the field of renewable energy, especially in photovoltaics, are being transferred to industry for the benefits of a more sustainable society with a growing energy demand. This example perfectly illustrates Empa's role as a bridge between research and practical applications.»

Another financing round for further growth

The recently announced investment, which is the fourth funding round for Flisom, comes from the company's existing strategic investor, Tata Group, India's largest conglomerate company. «With the investment received in 2013, Flisom refurbished an old factory building of 4500 square meters – which we just inaugurated – with a number of roll-to-roll processing machines. At the same time, we are developing the technology further on 50 cm-wide rolls on our machines on the Empa campus», says Flisom's Chief Operating Officer Sudheer Kumar. Adds Flisom Chief Executive Officer, Ulfert Rühle: «After the successful installation of machines and other infrastructure in Niederhasli the next step is to transfer the process know-how on these high-tech machines using specifically customized designs. Some of the machines are based on many years of development by experienced experts, innovative proprietary designs and complex engineering making them

unique for achieving cost- and performance-efficient targets for a breakthrough manufacturing.» The 15MW plant will serve as a blueprint for establishing larger production plants with a capacity of well over 100 MW.

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