Mass production of polymer solar cells within reach

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Ten years of intensive research and development at Risoe DTU (Technical University of Denmark) is now materialized in a fully operational production line for polymer solar cells at the Danish company Mekoprint A/S. Polymer solar cells which is an inexpensive alternative to silicon solar cells, has a significant industrial potential.

Production of polymer solar cells starts from a roll of flexible foil onto which the solar cell is built layer by layer by printing and finally rolled up onto the coil again. Encapsulated and ready-to-use units can thereafter be cut from the roll and according to the customer's specification. As the whole process from feedstock to finished product is performed roll-to-roll, the new production line paves the way towards mass production of solar cells and thereby correspondingly low prices.

Risoe DTU has supplied the printing technology as a complete package consisting of a custom-made printing head, inks for printing the solar cell's various layers and training of operators. Mekoprint has contributed with an established industrial infrastructure and their core technology which is industrial roll-to-roll production.

Professor at Risoe DTU Frederik C. Krebs is the driving force behind the Danish polymer solar cells. Ten years ago he started out with a bright idea, his two hands and a strong dedication. Today Frederik Krebs is the head of an international leading research team counting more than 25 persons - a team capable of combining world-class science with a strong desire to bring science out into real life. The Risø team distinguishing

themselves by being first to demonstrate new and innovation applications for the polymer solar cell: "The Solar Hat" - a hat powering a small FM radio (Roskilde Festival 2008), a solar-powered reading lamp for African schoolchildren (Zambia 2009) and the world's first grid-connected PV installation based on the polymer technology (Risoe 2009).

Risø's and Mekoprint's staffs have over the last months worked hard to rebuild one of Mekoprint's existing printing line to the new production, and the very first solar cells from this line were produced at 22 June 2010.

A line producing polymer solar cell is an important incentive for continuing the activities at Risoe DTU. The polymer solar cell technology is still young and immature compared to the 50-year old silicon technology. The gap between the two technologies is to be gradually reduced by focused research and development, and this task is already addressed by the Risø team.

Mekoprint's production strengthens Denmark's position among the international front runners in industrialization of polymer solar cells. "Mekoprint has the competencies and the experience necessary to manufacture high-volume and high-quality products for the electronics industry. The ability to conduct quality assurance of processes is essential when taking new products from the lab to the market, and this is where Mekoprint adds decisive value to the research project," says Karsten Ries, Divisional Director and responsible for the project at Mekoprint A/S.

Provided by Technical University of Denmark