PM INDIA
Linking High Potentials

Newsletter 12 / 4 May 2012

pmTUC RESEARCH NEWS

pmTUC research highlights at drupa 2012: Printed loudspeaker and solar tree

At drupa, the world's largest fair on print media technology, which takes place from 3 to 16 May 2012 in Düsseldorf, the pmTUC presents new research results, which truly make you prick up your ears: Loudspeakers that have been printed with flexography on standard paper. At drupa, the R&D group of Prof. Dr. Arved Hübler is co-exhibitor of press manufacturer Windmöller & Hölscher KG (Lengerich) and can be found in hall 15, booth A41/1.

The printed paper loudspeaker is connected to an audio amplifier like a conventional loudspeaker. Frequency response and hence sound quality are very good and the paper is surprisingly loud. Just the bass of the paper-based loudspeaker is a bit weak. The thin loudspeakers, which are printed in the laboratories of pmTUC, contain several layers of a conductive organic polymer and a piezoactive layer. The loudspeakers are astonishingly robust and can be produced in a very cheap way as mass printing methods are used. The bottom side of the paper loudspeaker provides unused space on which coloured messages can be printed.

A wide variety of new applications are possible. The paper loudspeakers could, for instance, be integrated into common print products. As such, they offer an enormous potential for the advertising segment, which is he driving force of the printing industry. In addition, sound wallpapers and purely technical applications, e.g., distance sensors, are possible, because the papers are also active in the ultrasound range. The loudspeaker of pmTUC was realised within the framework of the project Plastic Acoustics (PACU), which is funded by the Federal Ministry of Education and Research (BMBF) and includes the following project partners: Robert Bosch GmbH (Stuttgart), Heraeus Clevios GmbH (Leverkusen), X-Spex GmbH (Berlin), and Fraunhofer Institute for Electronic Nano Systems ENAS (Chemnitz).

Besides printed loudspeakers, pmTUC presents its innovative 3PV technology (printed paper photovoltaics), which was first published half a year ago. At drupa, the Chemnitz researchers exhibit a solar tree with 50 printed solar leaves. Similar to an ordinary tree, the leaves that face the sun collect energy. They are connected with snap fasteners and supply a battery via a cable in the hollow tree trunk. The solar cells have a moderate efficiency and shorter lifetime compared to conventional cells based on silicon, but the production costs are comparatively low. Therefore, they could become very useful for Asian countries like India where abundant sunlight is available throughout the day and year. The bottom side of the solar leaves can also be printed with advertisements. As such, the 3PV technology developed at Chemnitz University of Technology, could not just make a contribution to global power supplies in the future, but also enable the breakthrough of printed electronics.

In his book "print becomes electronics", which is published in English and German on occasion of drupa, Prof. Hübler analyses the backgrounds of this development and explains the transition that he expects to take place in the traditional graphic arts industry. According to Hübler, electronic media and conventional print media will increasingly merge in the future, i.e. a large part of electronics will be printed, and most print media will be electronic. Let's keep the eyes and ears open for the novel technologies yet to come! *AH, SS*

Photo: Messe Düsseldorf, C. Tillmann

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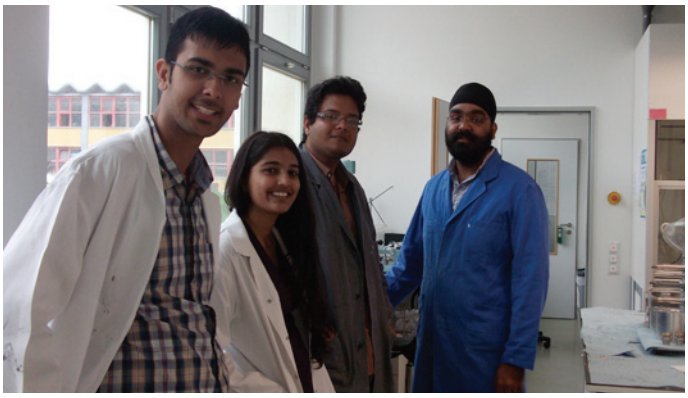
Prof. Hübler presents 3PV technology at WRETC-2012 in New Delhi

The Third World Renewable Energy Technology Congress (WRETC) took place from the 25 to 27 April 2012 in New Delhi, India. Guest speakers were invited from around the world, e.g., the UK, the US, and the Netherlands. Among the guest speakers was Prof. Dr. Arved Hübler, who was one of the key speakers and guest invitee of WRETC-2012. WRETC's main aim is the promotion of green technology for sustainability. Prof. Hübler gave a presentation on printed solar cells developed at the Institute for Print and Media Technology, widely known as 3PV – printed paper photovoltaics. Hübler announced that the printed solar cells of pmTUC may lead to a paradigm shift in solar technology. The reason is that conventional PV technology of today is not competitive in converting sunlight to electricity, because production and material costs are too high. 3PV, on the other hand, uses highly efficient mass printing technologies and low cost-materials. In addition, the solar cells can be easily recycled like other paper products. In his presentation, Hübler focused on the technological approach and 3PV application scenarios. For instance, he mentioned a solar tree with solar leaves, which could be used to generate electricity for some time. A prototype 3PV tree is among the main attractions of this year's drupa, which takes place from 3-16 May 2012 at Messe Düsseldorf. *SS, RV*

STUDENT NEWS

Internship at pmTUC – A lifetime experience

3 months ago, we – Surina, Gaurav, Tanvir and Snehil – set foot in Germany. We were overwhelmed by the order and perfection in the way things are done here. Coming from India, a country where chaos in every part of life is no surprise, it took us a while to get along with the German way of life. The university promised to organise the stay and other necessities and it was done well. Work seemed challenging, as we were for the first time exposed to state-of-the-art equipment and



methods of research. Topics like Piezoelectric materials, transistors, semiconductors etc. were new, so settling down and managing work at the same time was quite a challenge. There is always a lot to learn while working at TU Chemnitz with highly qualified scientists and professors. For instance, experiments, reports or material handling; everywhere we could see a stark difference in the way of working.

After going through intensive literature reviews of the topics given to us, we were finally set to work on current research projects like improving lifetime efficiency of organic printed photovoltaics or working on surface modified blankets. This was a unique experience for all of us, in the sense that we were now working on much more sophisticated machinery and infrastructure which was not so well-known to us before. To do an internship at pmTUC gives us the opportunity to see how smoothly things can work and experience it firsthand.

Our experience till now has been amazing. The methods which we had learnt in the classroom have gone hand in hand with things we are learning during this internship.

In these 3 months we have met different people, learnt about their culture, tradition and food. It was a fantastic experience to get to know different European cities and cultures while travelling around the countries. *interns*

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