Organic Photovoltaic at Fraunhofer IPMS, Dresden, Germany

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Devices and systems based on organic semiconductors show great opportunities for new applications in the field of electronics, displays, lighting and photovoltaic. Novel applications like organic solar cells will increase in the future. The Fraunhofer IPMS founded the Center for Organic Materials and Electronic Devices Dresden (COMEDD) to provide research and development services. To establish novel fabrication technologies, further research and development has to be done in a pilot production environment to reduce the time to volume production. The Fraunhofer-Gesellschaft decided to establish COMEDD with the aim of concentrating the necessary efforts for the research, development and pilot production in these novel market segments. The IPMS focuses on evaporable molecules for OLED as well as for organic photovoltaic.

In recent years Organic Photovoltaic became more important for research groups at universities and institutes, caused by new developments and higher efficiencies of organic solar cells. New concepts like tandem cells have been presented and first companies were founded. Nevertheless, most of the published data of organic solar cells are based on small devices with active areas << 1 cm^2. The goal of the IPMS is to bring organic photovoltaic based on the hetero-junction cell (HJC) concept to a higher level. That means transferring results achieved on small areas to areas up to 370 x 470 mm^2 and developing necessary fabrication technologies for highly efficient processes. Furthermore the IPMS provides services like cell and module layout, circuit development, encapsulation, testing, ageing and the integration of organic solar cells into products. At the end of these research services the IPMS will provide the manufacturing of demonstrators and prototypes based on the developed technologies and processes. The whole process chain with exception of material and stack development is covered by COMEDD.

For the realization of the described services COMEDD currently disposes of two deposition tools. Two additional ones are under construction. In table 1 a short description of the tools is presented.

	Prototype line Rigid substrates	Pilot line Rigid/Flexible substrates	Pilot line OLED-on-CMOS	Roll-to-Roll
Substrate size	200x200 mm^2	370 x 470 mm^2 (Generation 2)	150, 200 mm diameter	300 mm width
Substrate type	Glass	Glass or laminated foil	Silicon/CMOS wafer	Metal foil
Cycle time	120 minutes	3 minutes	60 minutes	-
Prototype/ technology research and development	Ready	Q4/2008	Ready	Q4/2008

Table 1: Deposition tools at Fraunhofer IPMS / COMEDD

As mentioned materials and stacks are not part of the IPMS and COMEDD, these topics are covered by partners like Heliatek GmbH, Dresden or Novaled AG, Dresden. Basic research topics can be processed in cooperation with the Institute for Applied Photo Physic, IAPP, TU Dresden.