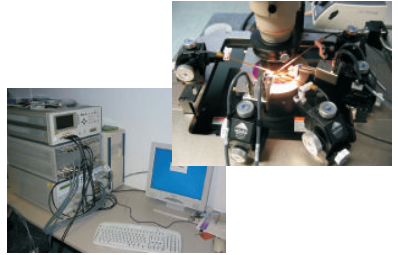


Characterization, Modeling and Simulation of Organic Devices and Circuits

Michael Sams, Christoph Lackner, Timm Ostermann, Richard Hagelauer
RIIC-Research Institute for Integrated Circuits, JK-University Linz, Austria, www.riic.at

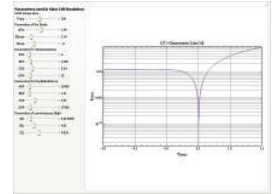
Characterization:

- layout design for appropriate teststructures
- adequate measurement equipment to receive required and necessary physical parameters for modeling
- data preparation and data processing for subsequent treatments



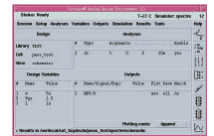
Modeling:

- modeling of the electrical behavior of different devices for circuit simulation based on physical and empirical parameters
- extraction of certain model parameters based on adequate fitting routines in e.g. Mathematica, Matlab, Excel
- implementation of the models in different, established simulation environments (e.g. Spice, Spectre, VHDL-AMS, VHDL)
- model verification based on simulations and measurements using basic teststructures



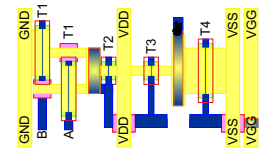
Simulation and Circuit Design:

- digital circuit design
 - analog circuit design
 - mixed-mode circuit design
- } with regard to process variations (corner-simulation)



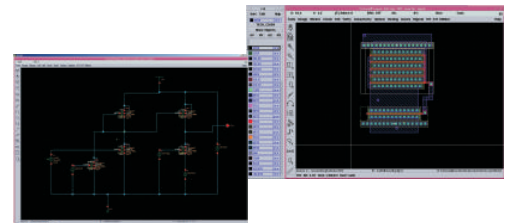
Layout (Mask Generation):

- for shadow masks
- for lithography
- for printing



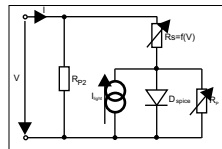
Development of a Design Environment for Organic Processes:

- schematic entry
- simulation environment
- layout environment
- design rule check
- layout vs. schematic
- post layout parameter extraction and simulation



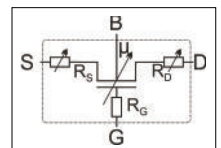
Diodes

- an enhanced dc model for photodiodes/ solar cells has been developed
- parameter extraction for the included lumped devices has been written in different tools (Mathematica, Excel)
- modeling of the dynamic behavior is ongoing



Transistors

- different model-strategies are combined to a new, more accurate model
- preparation of parameter sets for different devices (different structures, materials and types) is in progress
- circuit design has been done with previous models for e.g. Infineon



Collaborations

- LIOS-Linz Institute for organic solar cells (o. Univ. Prof. Dr. Serdar Sariciftci)
- Institute of Semiconductor and solid state physics (ao. Univ. Prof. Dr. Helmut Sitter)
- Konarka Austria Forschungs und Entwicklungs GmbH
- plastic electronic GmbH
- Infineon Technologies