

Paper Based Electronics Detection

Principal Investigator(s) and affiliation(s), contact information

Ronald Österbacka, (director) Professor in Physics
Åbo Akademi University
Phone (office): +358 2 215 4923
E-mail: rosterba@abo.fi

Members of the research group

Jouko Peltonen, Professor in Physical Chemistry
Marti Toivakka, Professor in Paper coating and converting
Carl-Eric Wilén, Professor in Polymer Technology

Description of the scientific aims

The mission of FunMat is to create and demonstrate new functionalities for future interactive products by combining advanced chemistry and complex materials with printing technologies. We have developed a unique paper electronics platform, where we have successfully demonstrated integrated paper-based electronic devices such as gas- and liquid phase sensors, transistors, logic circuits, and displays. At present FunMat is working towards the development of functional materials with controlled properties to clarify and control the material interactions with living cells and ultimately to employ stimuli-responsive functional materials for active stimulation and regulation of cell-fate to a desired state.

Selected publications 2010-

1. Anni Määttänen, Ulriika Vanamo, Petri Ihalainen, Petri Pulkkinen, Heikki Tenhu, Johan Bobacka, Jouko Peltonen: "A low-cost paper-based inkjet-printed platform for electrochemical analyses." *Sensors and Actuators B: Chemical* 2013, 177, 153-162.
2. Jukka Hassinen, Jussi Kauppila, Jarkko Leiro, Anni Määttänen, Petri Ihalainen, Jouko Peltonen, Jukka Lukkari: "Low-cost reduced graphene oxide-based conductometric nitrogen dioxide-sensitive sensor on paper." *Analytical and Bioanalytical Chemistry* 2013, 405, 3611-3617.
3. Petri Ihalainen, Himadri Majumdar, Tapani Viitala, Björn Törngren, Tuomas Näreoja, Anni Määttänen, Jawad Sarfraz, Harri Härmä, Marjo Yliperttula, Ronald Österbacka and Jouko Peltonen: "Application of paper-supported printed gold electrodes for impedimetric immunosensor development." *Biosensors* 2013, 3, 1-17.
4. F.S. Pettersson, J. Koskela, T. Remonen, Y. Zhang, S. Inkinen, R. Bollström, A. Määttänen, P. Ihalainen, A. Kilpelä, C-E. Wilén, M. Toivakka, J. Peltonen, and R. Österbacka, "Ion Modulated Transistors on Paper using Phase Separated Semiconductor/Insulator Blends", *MRS Communications* 4, 51-55 (2014).
5. R. Bollström, A. Määttänen, D. Tobjörk, P. Ihalainen, N. Kaihoviirta, R. Österbacka, J. Peltonen, and M. Toivakka, "A multilayer coated fiber-based substrate suitable for printed functionality", *Organic Electronics* 10, 1020-1023 (2009).