

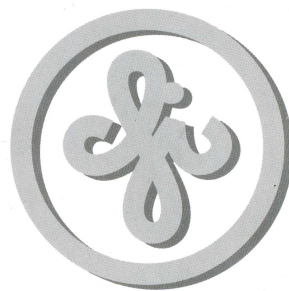
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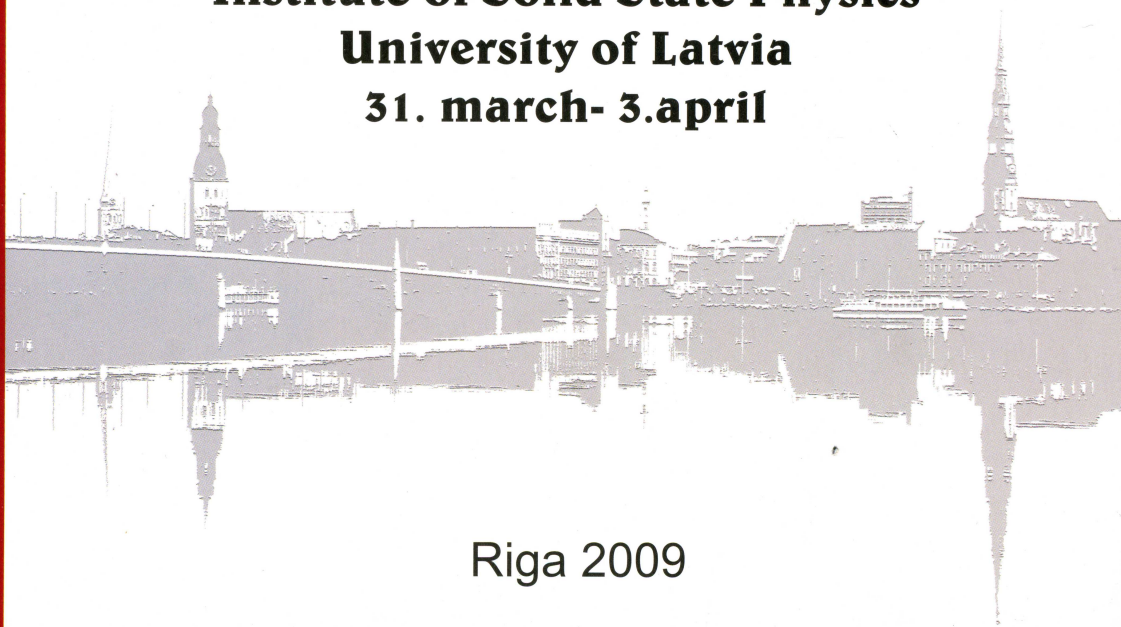
**International Baltic Sea  
Region conference**



**Functional  
materials and  
nanotechnologies  
2009**



**Institute of Solid State Physics  
University of Latvia  
31. march- 3.april**



Riga 2009

## PNCC ELECTRIC RESISTANCE VERSUS ORGANIC SOLVENTS VAPOUR CHARACTERISTICS

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There is a necessity for portable and relatively cheap device which could be used for rapid, reversible and in-situ volatile organic compound detection. We offer a polyisoprene-nanostructured carbon composite (PNCC) as a promising material for organic solvents vapour detection and identification in the environment. Previously obtained experimental results verify that PNCC can distinguish 10 different organic solvents saturated vapour. When PNCC is exposed to organic solvents vapour, molecules of vapour adsorb on the surface of the composite and diffuse into matrix material. At the same time decreases the tunnelling currents between carbon aggregates in thin layers of matrix and the electrical resistance of the composite increases. In the presence of organic solvents vapour electric resistance changes remarkably in short time (30s) and the effect is reversible. The largest electric resistance change velocity ( $v_R$ ) is observed for tetrahydrofuran (0,19404 K $\Omega$ /min), benzene (0,13082 K $\Omega$ /min) and ethylacetate (0,10694 K $\Omega$ /min) vapour. But nearly no  $v_R$  change is observed, when PNCC is exposed to propanol vapour (0,004028 K $\Omega$ /min). We relate this variant electric resistance response of PNCC to organic solvents vapour variant compatibility with the composite matrix material (polyisoprene) and variant organic solvents vapour molecule dimensions. To evaluate vapour compatibility with the composite matrix material we compared dielectric permeability values of vapour ( $\epsilon_v$ ) and polyisoprene ( $\epsilon_p$ ). We observed that larger  $v_R$  change is reached when  $\epsilon_v$  value is close to  $\epsilon_p$  (2,68) value. PNCC organic solvents vapour sensitivity is selective. The composite does not respond or respond weakly to polar organic solvents vapour presence. Also in the electric resistance response evaluation of PNCC molecule dimensions of organic solvents vapour should be taken into account. As smaller the diameter of vapour and better compatibility with matrix material as greater electric resistance response of PNCC is observed.