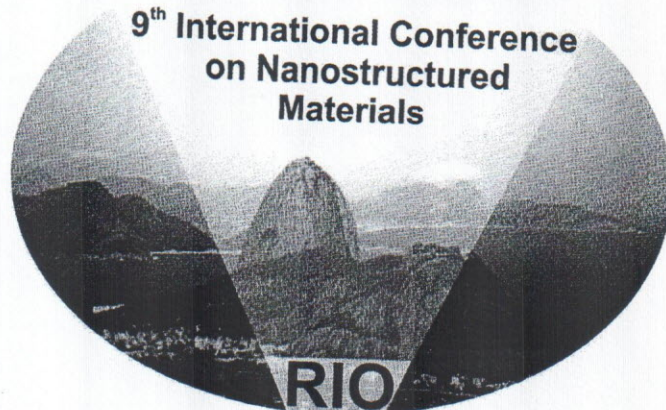


# **NANO - 2008**

**9<sup>th</sup> International Conference  
on Nanostructured  
Materials**



**RIO**  
RIO  
RIO  
RIO  
RIO

.....●●●●●●●●●●  
**01 - 06 June 2008**

●●●●●●●●●●.....  
**Rio de Janeiro - Brazil**

.....●●●●●●●●●●.....  
**ABSTRACTS**



## Application of Line Patterning Technique to developed optical pH sensors, using polyaniline by *in-situ* deposition onto poly(ethylene terephthalate) (PET).

R. T. Paschoalin<sup>1,2</sup>, P. S. de P. Herrmann Jr.<sup>1</sup>, W. L. B. Melo<sup>1</sup>, J. Bramorski<sup>3</sup> and S. Crestana<sup>4</sup>

<sup>1</sup> Embrapa Instrumentação Agropecuária, Embrapa Instrumentação Agropecuária, São Carlos, São Paulo, Brazil

<sup>2</sup> Unicep, São Carlos, São Paulo, Brazil

<sup>3</sup> Universidade de São Paulo (USP), Centro de Recursos Hídricos e Ecologia Aplicada, São Carlos, São Paulo, Brazil

<sup>4</sup> Embrapa Sede, Parque Estação Biológica, Brasília, DF, Brazil.

In the last ten years the interest for developing new sensors for industry, agriculture, the environmental, and medicine applications has increased. The line patterning technique [1] was used to make a mask to developing a low-cost optical sensor, built in the ribbons of poly(ethylene terephthalate) (PET) film, using a thin film of polyaniline (PANI) in the emeraldine oxidation state [2] doped with HCl, by *in-situ* chemical polymerization. The measurements occurred with conductive polymers doped and dedoped, and were used to evaluate the pH of natural water. The absorption of UV-Vis spectra was investigated to evaluate the optical response of the to pH change of natural water, and the comparison with common technique used to measure the value of water pH (Horiba) in the natural condition. The sensitivity and reproductibility was evaluated. The color change in function of pH was obtained after 5, 10 and 15minutes in water solution. The ribbons showed a reversible color features upon variation of the pH. The pH ranges used to calibrate the optical sensor were from 2.0 to 12.0. The set of absorption spectra were obtained in buffers of different pH, with steps of 0.5, from 4.0 to 8.0. The investigations open new opportunity to develop optical "throw-away" sensors, using nanotechnology and the proprieties of the polyaniline.

Work supported by CNPq, (Brazilian funding agency) under contract number 485921/2006-5, Embrapa Instrumentação Agropecuária to facilities, Macroprogram 1 (MP1) - 01.05.101.00, National Laboratory of Nanotechnology to Agribusiness

- [1] A. E. Job, P. S. P. Herrmann, D. O. Vaz, L. H. C. Mattoso, J. Applied Polymer Science, **79**, 1220, (2001).
- [2] E. C. Venâncio, L. H. C. Mattoso, P. S. P. Herrmann Junior, A. G. MacDiarmid, Sensors and Actuators B, **130**, 723-729, (2008)

Corresponding author: Paulo Sergio de Paula Herrmann Jr., [herrmann@cnpdia.embrapa.br](mailto:herrmann@cnpdia.embrapa.br)

**Keywords:** line patterning technique, pH sensor, polyaniline, poly(ethylene terephthalate), thin films, optical proprieties.