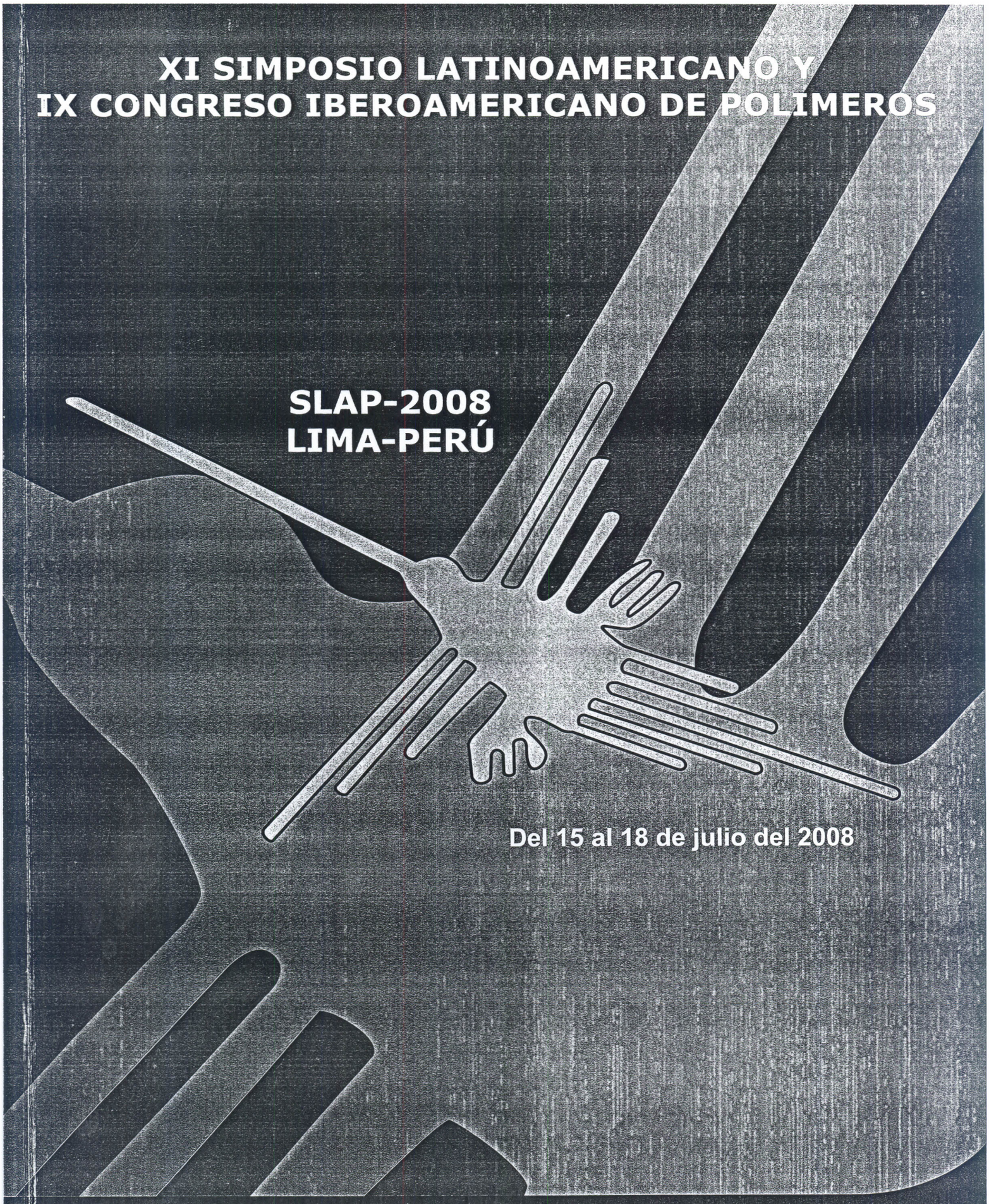
XI SIMPOSIO LATINOAMERICANO Y IX CONGRESO IBEROAMERICANO DE POLIMEROS



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ELECTROSPUN CONDUCTING NANOFIBERS OF POLYANILINE/POLY(LACTIC ACID)

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The electrospinning technology has been successfully employed to prepare PAni-based conducting nanofibers from a solution of pure polyaniline[1]. In this report ultrafine fibers of polyaniline doped with p-toluene sulfonic acid (PAni.TSA) blended with poly (L-lactic acid) (PLA) were prepared by the electrospinning technique. It was found that the presence of polyaniline resulted in fibers with diameter as thin as 100 nm and a significant decrease of the bead formation. The fibers presented only one phase indicating good interaction between the components and a good dispersion of the polyaniline in the medium as shown in Figure 1.

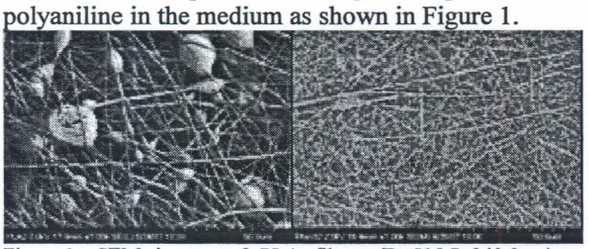

Figure.1- SEM images of PLA fibers (D=515.7±240.0nm) and Pani.TSA/PLA fibers (D= 133.8 ± 57.6 nm)

The high interaction between the components and the rapid evaporation of the solvent during the electrospinning process, resulted in nanofibers with lower crystallinity degree as compared to the casted films with the same proportions of Pani and PLA[2]. Figure 2 shows the comparative diffractions of one electrospun fiber sample and the corresponding cast film. The fibers present the mainly reflections of PLA α crystal structure, and an expressive amorphous halo, indicating lower crystallinity values when compared with the cast films. Also, in some related samples small reflections at 25° and 30° reveal the coexistence of the α and β crystal structures of the PLA component [3].

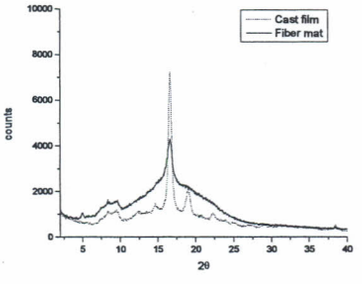

Fig.2- Comparative XDR diffraction patterns of Pani-TSA/PLA cast film and electrospun fiber.

The electrical conductivity of the Pani-TSA/PLA electrospun fiber mats and the cast films are presented in Figure 3 as function of Pani content. It was observed lower resistivity values of the fiber mats than that of the blend films produced by casting. This may be explained due to the high degree of the PAni dispersion and the high porosity of the non-woven mat.

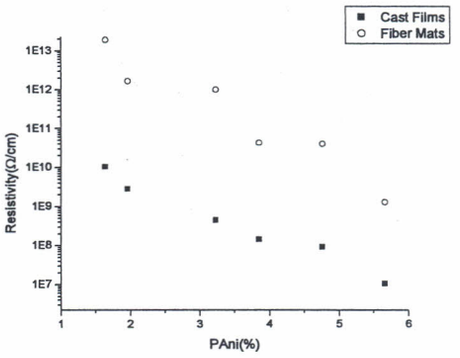

Figure.3- Volumetric resistivity of Pani-TSA/PLA electrospun fiber mats and the correspondin casting films.

This novel system opens up new and interesting opportunities for applications in the areas of biomedical devices and biodegradable composites and sensors, among others.

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