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Natural rubber with gold nanoparticles: Estimation of the amount of nanoparticles in a sample using wavelet transforms

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This study aims to choose the best wavelet, between daublet, coiflet and symmlet, to estimate the number of gold nanoparticles incorpored into natural rubber samples. The latex was collected from different rubber trees of the RRIM 600 clone, and natural rubber membranes were fabricated by casting latex stabilized with 2% of ammonium hydroxide on glass and annealing for 10 hours at 65°C. The formation of AuNPs was achieved by direct reaction of the natural rubber membrane in a solution of gold chloride, where the synthesis was realized at 80°C for periods of 6, 9, 30, 60 and 120 minutes of immersion. The natural rubber membranes with gold nanoparticles were used in chemistry analysis and ultrasensitive detection by Raman spectroscopy, constructing flexible SERS and SERRS substrates, as well as in the study of influence of natural rubber/Au nanoparticle membranes on the physiology of Leishmania braziliensis protozoans. Different wavelets were applied in images of natural rubber samples with gold nanoparticles, and the template matching technique was applied in the samples generated in different reduction times. The wavelet that leads to better results was chosen as the best wavelet, between the candidates, to characterize the nanoparticles in the images.

Biography

Alexandre Fioravante de Siqueira has obtained his MSc. degree at Material Sciences and Technology from Unesp, the University of the State of São Paulo. Nowadays he is a PhD. student at the same university, working with image processing, pattern recognition, computational vision and wavelet transforms applied in researches based in natural rubber at the Polymers, Rubber and Applications and Leather Analysis laboratories at Faculty of Sciences and Technology, Unesp.

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