Carbon nanoparticles from local biomass, first result

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Friction and wear are the first causes of the decrease in performance and durability in mechanical systems. The role of lubrication is to minimize friction between the sliding surfaces and to protect them from wear. Conventional liquid lubricants are constituted of a base oil and additives presenting specific properties, such as friction reduction, antiwear or anti-oxidizing action.

Commercial lubricants generally use graphite and petroleum-based oils because of their recognized lubricating properties, their stability and low cost. However, such lubricants induce health and environmental hazards due to their life cycle. The aim of this work is to investigate the possibility to use local biomass in order to produce environmentally-friendly additives for lubricants. Our study mainly concerns the synthesis of theses new friction reducer additives. New carbon phases are obtained from glycolic solutions, stemming from by-products of our agriculture, using the spray-pyrolysis technique [1]. This technique consists in nebulizing in the form of micro-droplets a solution of saccharose, transported via a carrier neutral gas in a tubular oven heated at temperatures ranging from 600°C to 1200°C. Carbon nanoparticles are then obtained.

Here are described the promising first results related to the determination of the optimal synthesis conditions, i.e. the catalyst concentration the carrier gas pressure and the temperature of the tubular oven. Scanning electron microscopy and Raman spectrometry analyses are carried out, allowing us to observe the spherical shape and the porosity of the particles and to determine the graphitization degree of the carbon phases [2].

[1] Nanostructured Carbons Prepared by Ultrasonic Spray Pyrolysis
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[2] Raman spectroscopy of closed-shell carbon particles
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