BIOCHAR FOR GAS SENSOR DEVICES

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In recent years, biochar applications are present in many fields [1]. It has been studied as substitution for more expensive carbon materials like carbon nanotubes, graphene and others. The evident advantage for biochar is its low cost of production, being an environmentally friendly source of huge carbon content.
On the other hand, nowadays the main application of this material is as field amendment in agriculture [2].
Starting for the peculiarity of biochar, it is possible to modify its features. For instance, after high temperature treatments, its surface area can increase sharply.
This property, together with the porosity, are essential for gas sensors technology.
In this work, we have investigated different gas sensors based on Biochar sensitive thick film, derived from diverse precursors. As results, biochar with different characteristics were obtained. Biochar-based humidity sensor were prepared by drop-coating technique and tested towards relative humidity.
To indagate the properties of biochar-based humidity sensors, FESEM, BET, Raman and Laser-granulometry test were carried out. Biochar's response towards relative humidity were studied at room temperature. Humidity sensing starts around 5% of relative humidity, varying impedance of 2 orders of magnitude after exposure to 100% of relative humidity, and response and recovery times were both reasonably fast (in the order of 1 minute).
To conclude, sensors performance of biochar appears extremely promising for new applications of this "waste" material as humidity sensor both in environmental monitoring and in many industrial processes.

References

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