

Renewable materials applied to electronics

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Today there is a strong interest in the use of sustainable materials and in some cases, materials from renewable origin for electronic applications, driven by the development goals as well as by low-cost applications. One of the most representative examples is cellulose, not only in the form of raw material mainly for pulp and paper production, but also in the development of advanced materials/products with tailor-made properties, especially the ones based on nanostructures.

Paper offers a cheap, flexible and biodegradable alternative substrate to silicon for simple electronic devices like disposable sensors. Office copy paper is 10,000 times cheaper than silicon, but it also avoids the problems of electronic waste.

Another advantage of paper relies on its biodegradability and thus its use can release some of the urgent issues and challenges of the electronic waste management.

Indeed, although paper electronics cannot compete with silicon-based electronics in complex integrated circuits, simpler electronic components and sensors could be fabricated on paper substrates at a sizeable lower cost and with lower electronic waste footprint. Paper flexibility also makes it particularly suitable for flexible electronics applications.

In this talk we will discuss the state of the art and potential future directions in paper-based electronics with special emphasis to the work developed at CENIMAT|i3N, covering electronic devices, smart displays, printed electronics, sensors and diagnostic tests.