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A multifunctional material based on co-electrospinning for developing biosensors with optical oxygen transduction

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ABSTRACT

A multifunctional material based on co-electrospinning has been developed as a basic material for the development of biosensors with optical oxygen transduction. It is based on coaxial nanofibres: inner fibres containing an oxygen sensitive dye and outer fibres containing aldehyde groups to allow the formation of Schiff bases with the amino groups of the enzyme. The resulting material preserves the oxygen sensing properties of the inner optical transducer as well as exhibits a high capacity for immobilizing molecules on its surface.

Uricase has been selected as model enzyme and several parameters (temperature, pH, reaction time, buffer, and enzyme concentration) have been optimised to demonstrate the versatility of this novel multifunctional material in the development of biosensors with optical oxygen transduction for determining uric acid in serum samples. It suggests that the proposed multifunctional material can provide a promising multifunctional platform for biosensing applications.

Keywords: Multifunctional material; Nanotechnology; Oxygen transduction; Optical biosensor; Uric acid.