Conductive Laccase- ~~Immobilized~~ Functionalized Membrane for Active Lignin Degradation

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Laccase-functionalized membranes have been prepared and shown to~~have successfully~~ transform~~ed~~ lignin monomers~~, and~~ yield~~inged enhanced~~ value-added product. To improve functionality and versatility~~,, fabrication of a multi-enzyme membrane has been developed.~~ l~~L~~accase was then immobilized on~~to~~ a conductive membrane~~. Appropriately positioned lysines in engineered enzymes can afford increased active site access to substrates carried in the solvent stream~~. ~~Furthermore~~This enables~~, we~~ exploitation of~~ed~~ the redox chemistry that is inherent to laccase and central to lignin degradation. An e~~An e~~lectrically-~~-~~conductive membrane support (and matrix) was ~~electrically~~ connected to a recording circuit to permit continuous real-time monitoring of the oxidative conversion and allowed reporting of the membrane performance and status as well. ~~Our~~ This device, ~~connecting the membrane to a potentiostat, also permit~~applying external voltage to immobilized enzymes should ~~ted electrochemical~~ drive~~ing of otherwise~~ thermodynamically-~~-~~unfavorable reactions. Thus, the degradation of thermodynamically stable compounds ~~was~~ may be achievable~~ed~~ via application of additional voltage when needed. Such redox-~~-~~reactive biomimetic membranes may make possible ~~have the potential to yield~~ enhanced lignin degradation and water remediation.