

## Fibre optic biosensors based on encapsulated biomolecules in sol-gel thin films

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The coupling of biomolecules (enzymes, antibodies, etc.) as molecular recognition elements with sol-gel technology creates exciting possibilities for fibre optic biosensing. A sol-gel matrix offers several advantages for biomolecules entrapment such as inherent low-temperature processing conditions, simplicity, tunable porosity, chemical inertness to bioactive components, control of surface architecture, and ability to form films/monoliths. Fibre optic biosensors with biomolecules entrapped in sol-gel-derived thin films are presented. Applications reviewed include fibre optic biosensors for the detection of the following analytes: biological oxygen demand (BOD), atrazine [herbicides], H<sub>2</sub>O<sub>2</sub>, glucose, L-lactate, acetylcholine (ACh), naphthalene and salicylate, carbaryl (a carbamate) and dichlorvos (an organophosphate), urea, nitrite ions, nitrate ions (NO<sup>3-</sup>), nitrogen monoxide (NO) and carbon monoxide (CO), bacteria endotoxins (BE), acetazolamide, cholesterol, and dichloro-diphenyl-trichloroethane (DDT).

### Biography

Semanu K. Tsei is a Chemical Engineer and a graduate of Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. He is pursuing **M.Phil. /D.Phil. in Electrical and Electronic Engineering Science** at the University of Johannesburg, South Africa. His research interest is in the niche area of fibre optic chemical sensors and biosensors based on sol-gel-derived thin films with applications in; bioprocess, biomedical, and bioremediation engineering. He is a member of the following professional bodies: American Institute of Chemical Engineers (AIChE), IChemE, International Sol-Gel Society (ISGS), Japan Society of Chemical Engineers (JSCE), and Society of Biological Engineering (SBE). Semanu's research work focuses on developing sol-gel-based fibre optic biosensors with longer (extensively improved) shelf lives and applicable in wider ranges of pH and temperature conditions. He is exploiting the synergy between Photonics and Nano-biotechnology to achieve his research goals. Additionally, his research work would resuscitate fibre optic biosensing in Photonics Research Group, at the University of Johannesburg, South Africa.

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