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(57) Abstract :

The present invention relates to a method for immobilizing the oxygen-sensitive dye tris(2,2'-bipyridyl dichlororuthenium) hexahydrate on glass substrates through layer-by-layer self-assembly with poly(sodium styrenesulfonate) (PSS) and poly(diallyl dimethylammonium) chloride (PDDA). The process resulted in ultrathin, controllable dye-polyion layers, characterized by SEM for thickness and surface roughness. Direct assembly with PSS alone was unsuccessful, whereas pre-mixing with PSS enabled successful formation of interpolyelectrolyte complexes alternated with PDDA layers. The immobilized dye exhibited maintained oxygen sensitivity, calibrated over a 0 to 10% dissolved oxygen range, following a Stern-Volmer relationship. Short-term applications include integration into fiber-optic probes and bioreactor sensors, leveraging cost-effective components. Future research focuses on integration into tissue cultures and comprehensive characterization, despite initial promising viability demonstrated by this study

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