OPTICAL FIBRE SENSOR FOR pH BASED ON POLYANILINE / NYLON COMPOSITE

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An optical fibre sensor for pH has been developed based on a polyaniline / nylon composite. The electrochromic polymer composite provided a reagent phase that was easily processible, mechanically stable and affixed well on the sensing tip of an optical fibre. Its preparation involved relatively simple procedures and yielded a strongly immobilized polyaniline layer. It exhibited the characteristic colour of polyaniline in the presence of an acid (green) and of a base (blue). The sensor was fabricated as an optode, with the composite membrane set on the distal end of a bifurcated optical fibre bundle. The reflectance of the membrane was monitored through a fibre optic instrumentation system. The sensor showed reversibility and very good reproducibility in its response to pH. Its sensitivity to pH was found to be affected by the parameters involved in the preparation of the reagent phase, such as the monomer concentration, oxidant concentration, acid concentration and reaction time. The reaction conditions were optimized to yield a sensor with a high sensitivity to pH. The sensor response exhibited very good linearity in the pH range of 4 to 9.