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Design of multimode tapered fibre sensor for glucose detection

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Abstract: In this paper the comparison behaviour between a tapered silica Multi-Mode Fibre (MMF) and a Plastic Multi-Mode (PMM) fibre is proposed. The tapered silica MMF (tapered core and cladding) and PMM fibre (only core) sensors use a Tunable Laser Source (TLS) at 1550 nm and a yellow He-Ne laser at 594 nm as the sources for measuring the attenuation of the input signal when the sensor is being soaked into the glucose solution. From this work, the tapered PMM fibre performs better in terms of its linearity, and provides a reliable calibration graph of glucose concentration against output signal. It has a sensitivity of 0.0088 mV/% and an error of 2.6 percent with a resolution of 0.36%. The tapered silica MMF has a better sensitivity, error and a better resolution but a lesser degree of linearity.

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