

- [54] **TAPERED FIBRE SENSOR**
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- [58] **Field of Search** 350/96.26, 96.29, 96.15

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[57] **ABSTRACT**

A fibre sensor used for the measurement of ambient refractive index has a tapered end. The taper of the optical fibre generates cladding modes which undergo multiple reflections at the external surface of the fibre, and therefore gives high sensitivity to the ambient index. A tapered fibre is also relatively immune to contamination by adhering droplets when the end reflection is used since the droplets tend to move to the point of greatest radius, which tends to be away from the point where the Fresnel reflection of interest occurs. The reflection from the tapered end of a multimode fibre is measured as a function of ambient refractive index. In contrast to a square-cleaved fibre, the reflection from a tapered fibre is monotonically related to the ambient index, removing an ambiguity that occurs when refractive index is measured by Fresnel reflection at normal incidence. Tapered optical fibres are suitable for probes to identify the interface between immiscible liquids.

8 Claims, 5 Drawing Sheets

