

## **Tapered optical fiber coated with graphene based nanomaterials for measurement of ethanol concentrations in water**

### **ABSTRACT**

Tapered optical fibers coated with graphene and graphene oxide (GO) as the active layer for ethanol sensing were reported. The multimode optical fiber with 125  $\mu\text{m}$  diameter was tapered to 40  $\mu\text{m}$  diameter to enhance the sensitivity. Graphene and GO thin films were characterized using a scanning electron microscopy, Raman spectroscopy and ultravioletó visible (UVóVis) spectroscopy. The absorbance properties of the developed sensors increased when exposed to ethanol due to the change of light in the evanescent field. The sensing results indicated that the GO-coated sensor showed better performance with absorbance change of 80 % towards ethanol concentration of 5 % when compared to graphene-coated sensor with 40 % absorbance change towards ethanol with similar concentrations. The reliable response of the graphene and GO-coated on tapered fibers for detecting ethanol concentrations was achieved at room temperature.

**Keyword:** Absorbance; Ethanol sensor; Graphene; Optical fiber sensor; Tapered optical fiber