Supplementary Materials: In-Situ Ellipsometric Study of the Optical Properties of LTL-Doped Thin Film Sensors for Copper(II) Ion Detection

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1. Contact Angle Measurement

The wettability of the uncoated and coated films was estimated using a First Ten Angstroms (FTA200, US) surface energy analyser. A water drop of definite volume was dropped on the sample surface in the horizontal position. The drop formation and final shape were recorded with a high speed camera and the image processed by computer. Drop shape was calculated in terms of the contact angle between the substrate surface and a tangent from the edge to the contour of the drop. Angles <90° indicates a hydrophilic surface while angles >90° indicate a hydrophobic surface. The mean of three values were reported for the experiment.

The results from the characterisation of the films hydrophobicity are presented in Figure 1S.

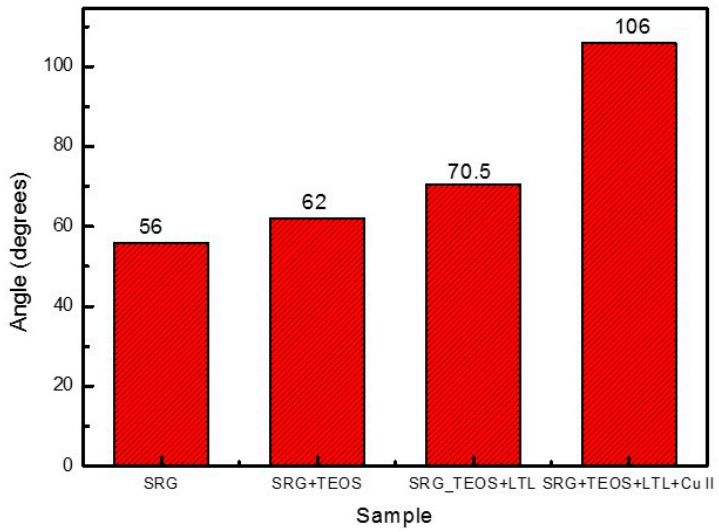

Figure S1. Contact angle results for uncoated and coated films: SRG-surface relief grating; SRG-TEOS-sol-gel coated surface relief grating; SRG-TEOS-LTL-zeolite-doped sol-gel coated surface relief grating; SRG-TEOS-LTL-Cu II zeolite-doped sol-gel coated surface relief grating exposed to 4 mM Cu^{2+} solution.

2. Extinction Coefficient of the Films

The calculated extinction coefficients, *k*, for the films in air, water and 4 mM Cu^{2+} solution are presented in Table S1. These values are averaged over three different samples and the deviations

from average value are in the range (0.6–1) × 10^{-3} with exception of 3 × 10^{-3} for the TEOS-only (170 °C) samples. Immersion does not lead to some substantial change in *k*, nor is some trend observed. This demonstrates that the absorption of the films at the wavelengths used in this study is negligible.

Table S1. Extinction coefficients at wavelength of 633 nm.

Film Type	Air	Water	4 mM $CuSO_4$
TEOS (170 °C)	$6.10^{-3} \pm 3.10^{-3}$	0	2.10^{-3}
TEOS (320 °C)	$2.10^{-3} \pm 1.10^{-3}$	0	0
TEOS-LTL (170 °C)	$1.10^{-3} \pm 6.10^{-4}$	6.10^{-4}	9.10^{-4}
TEOS-LTL (320 °C)	$1.3.10^{-3} \pm 7.10^{-4}$	2.10^{-3}	3.10^{-3}