

## Supporting information

### **Thiol-mediated etching of gold nanorods as a neoteric strategy for room-temperature and multicolor detection of nitrite and nitrate**

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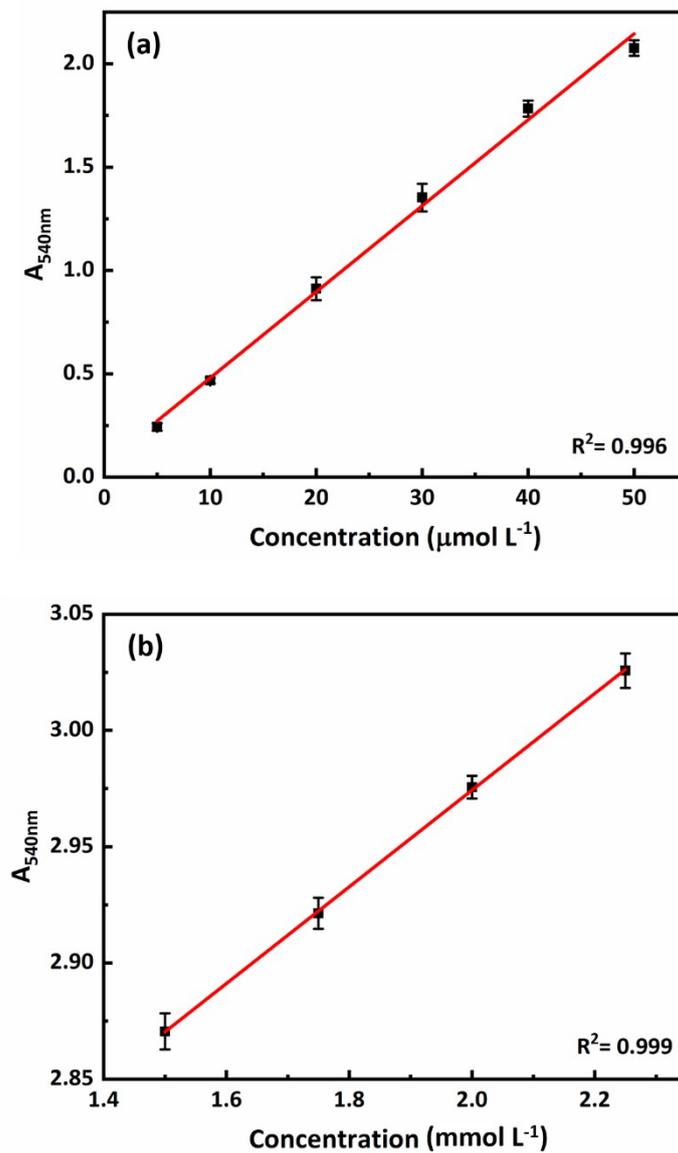
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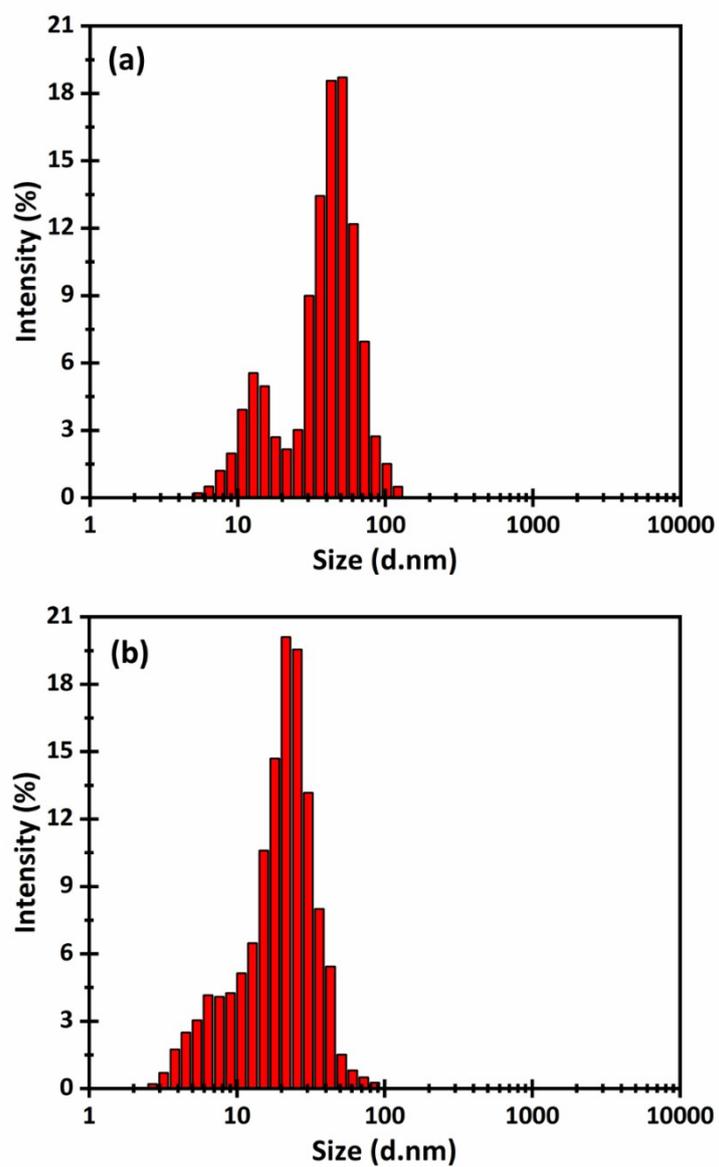
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**Table S1.** Characteristics of water, soil, salami, and sausage samples used for nitrite assay

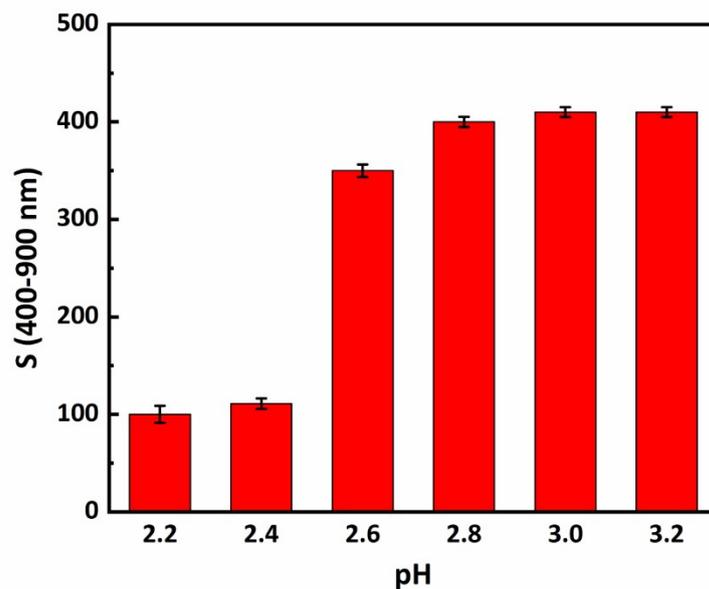
<b>Sample</b>	<b>EC (ds m<sup>-1</sup>)</b>	<b>pH</b>	<b>Sand (%)</b>	<b>Silt (%)</b>	<b>Clay (%)</b>	<b>Soil texture</b>
Campus water	0.29	7.50	-	-	-	-
Tap water	0.75	7.40	-	-	-	-
Well water (1)	0.37	7.80	-	-	-	-
Well water (2)	0.48	7.80	-	-	-	-
Well water (3)	0.41	7.60	-	-	-	-
Soil (tomato)	1.6	8.37	25.5	39.1	35.4	Clay loam
Soil (pepper)	1.1	8.42	29.5	35.3	35.2	Clay loam
Soil (onion)	1.2	8.40	26.5	37.3	36.2	Clay loam
Soil (apple)	1.52	8.41	36.5	36.3	27.2	Clay loam/Loam
Soil (maize)	2.73	8.18	30.0	50.0	20.0	Silt loam/Loam
Salami	1.62	5.71	-	-	-	-
Sausage	1.53	5.70	-	-	-	-



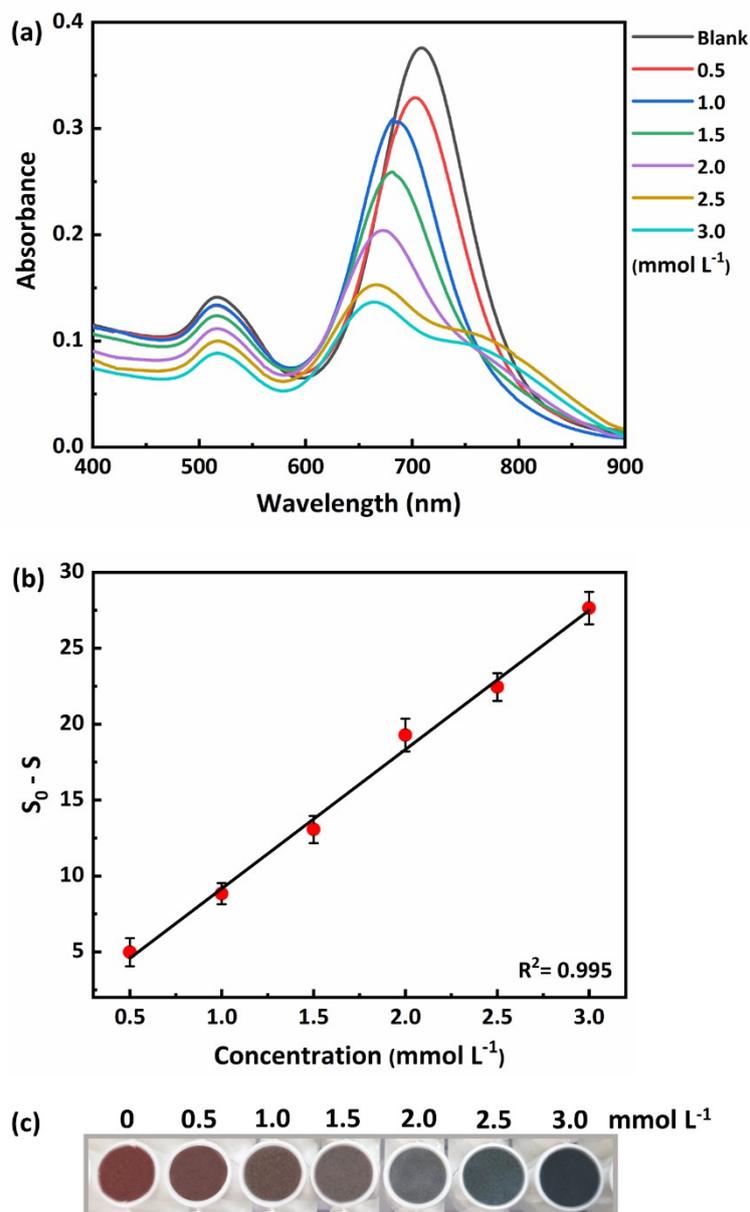
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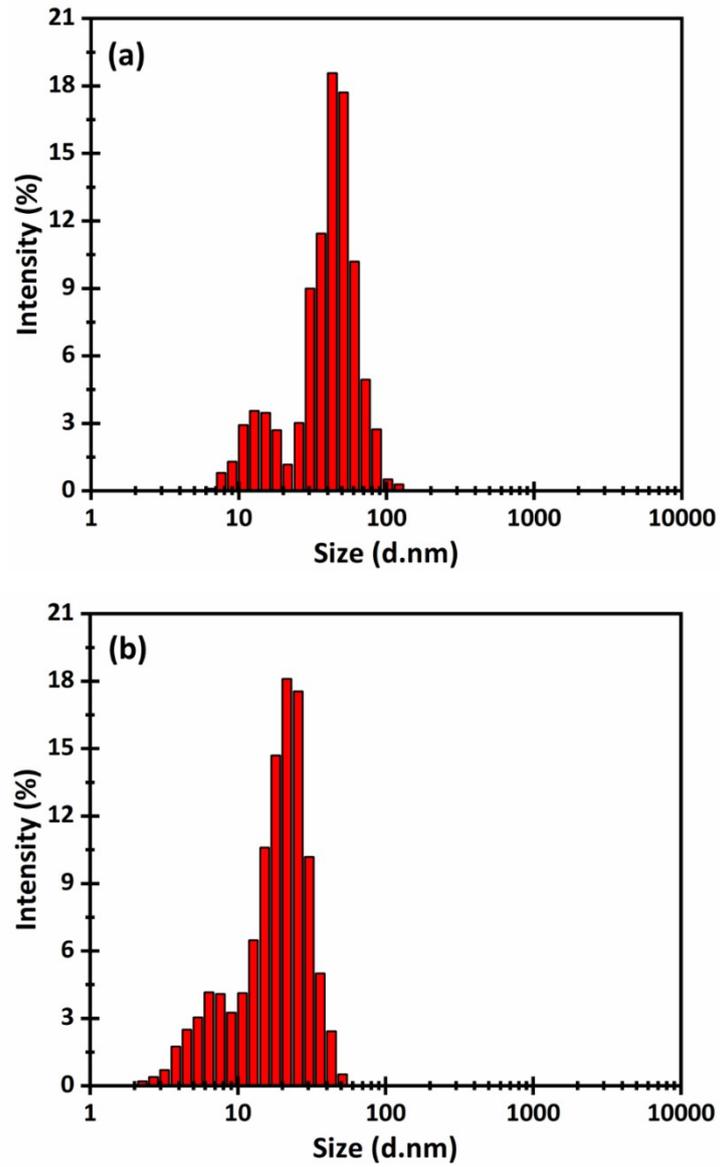
**Fig. S2.** Intensity size distribution of the developed probe in the absence and presence of nitrite ( $40 \mu\text{mol L}^{-1}$ )



**Fig. S3.** The effect of pH on the AuNRs etching in the presence of 5.0 mmol L<sup>-1</sup> of glycine-HCl buffer at different pHs, 150 μmol L<sup>-1</sup> of nitrite ion, 40 mmol L<sup>-1</sup> of CTAB, and 25 mmol L<sup>-1</sup> of thiourea at time 30 min



**Fig. S4.** (a) Absorbance spectra of the probe in the presence of different concentrations of nitrate (0.5-3.0 mmol L<sup>-1</sup>). (b) The linear relationship between the response ( $S_0-S$ ) and the concentration of nitrate. (c) The images of the probe in the presence of different concentrations of nitrite at the top of a white 96-well plate



**Fig. S5.** Intensity size distribution of the developed probe in the absence and presence of nitrate ( $2.0 \text{ mmol L}^{-1}$ )

**Table S2.** Comparison of reported colorimetric methods based on AuNPs for the detection of nitrite and nitrate

Plasmonic NPs	Shape of NPs	Mechanism	Temperature (°C)	Real sample	Nitrate detection	Ref.
Aniline- and naphthalene-modified AuNPs	Sphere	Aggregation	95	Drinking water	✓	[1]
4-Aminothiophenol-modified AuNRs	Rod	Aggregation	95	Drinking water	×	[2]
Citrate-capped AuNPs/ Phenylenediamine	Sphere	Anti-aggregation	37	Tap water	×	[3]
Citrate-capped AuNPs/ 4- Aminothiophenol	Sphere	Anti-aggregation	Room temperature	Under ground and tap water	×	[4]
AuNRs	Rod	Etching	55	Drinking water	×	[5]
AuNRs	Rod	Etching	Room temperature	Tap and well water, soil (pepper, onion, apple, maize), salami, and sausage	✓	This work

## References

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