Supporting Information

Electronic nose based on multi-patterns of ZnO nanorods on a quartz resonator with remote electrodes

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Experimental Setup

Figure S1a shows a schematic diagram of the overall experimental setup for the detection of adulterated gasoline using the electrodeless MQCM. Figure S1b shows a detailed view of the QC chamber. Circular electrodes 17 mm were integrated into the chamber. The distance between each electrode and the surface of the quartz plate was approximately 0.8 mm. The adulterated gasoline was detected using a stream of dry nitrogen as a carrier gas. The nitrogen stream was bubbled through a sample of the adulterated gasoline to generate vapor. The gas flow was switched between nitrogen and the vapor using 3-way valves. The gas was then introduced into the sensing chamber through two side inlets, and the gas exited through one central outlet.

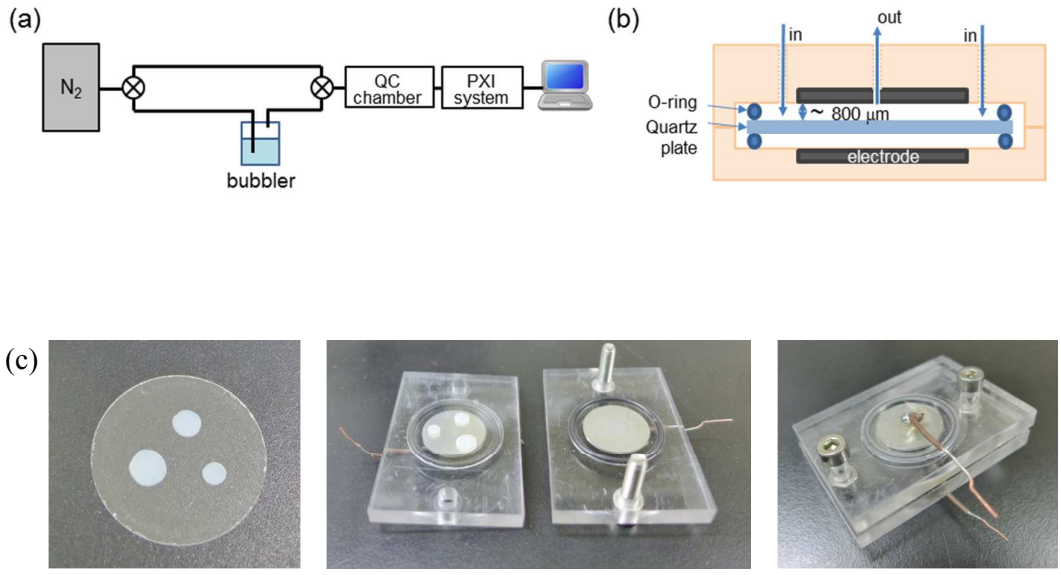


Figure S1. Schematic representation of (a) the overall experimental setup for the detection of adulterated gasoline, (b) a detailed view of the QC chamber and (c) optical images of the electrodeless QCM setup.

Changes in QF

Figure S2 shows the conductance spectra of electrodeless quartz crystal plate before and after growing ZnO nanorods for 4 h. The QF increased from 8000 to 42000 by the growth of ZnO nanorods.

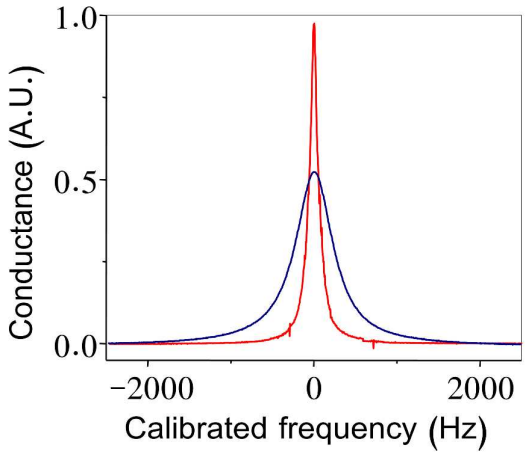
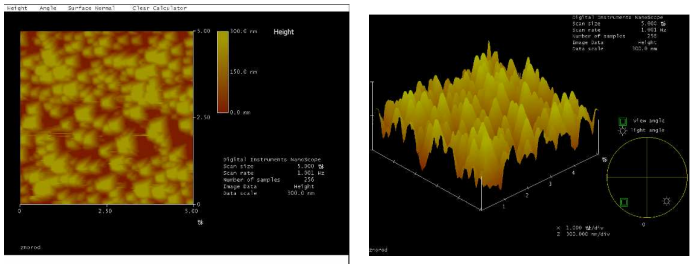


Figure S2. Conductance spectra of electrodeless quartz resonator before (blue) and after (red) growing ZnO nanorods for 4 h.

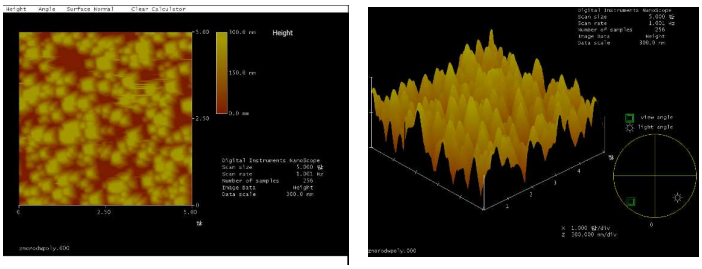
AFM Images of ZnO nanorods before and after polymer coating, and gas experiment

Figure S3a and S3b shows AFM images of the ZnO nanorods before and after the polymer coating, and gas experiment, respectively. Negligible differences in the shape were observed.

(a)



(b)



(c)

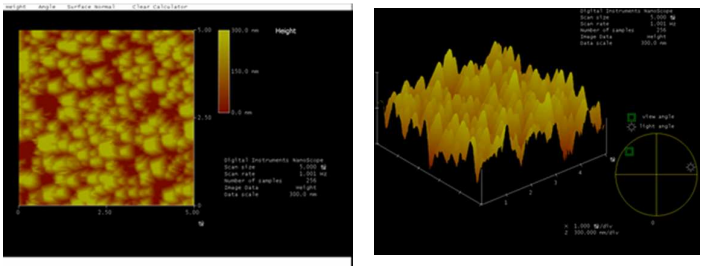


Figure S3. AFM images of the ZnO nanorods (a) before and (b) after the polymer coating, and (c) after gas experiment.