Supporting Information (SI):

Monolayer-Capped *Cubic* Platinum Nanoparticles for Sensing Nonpolar Analytes in Highly Humid Atmospheres

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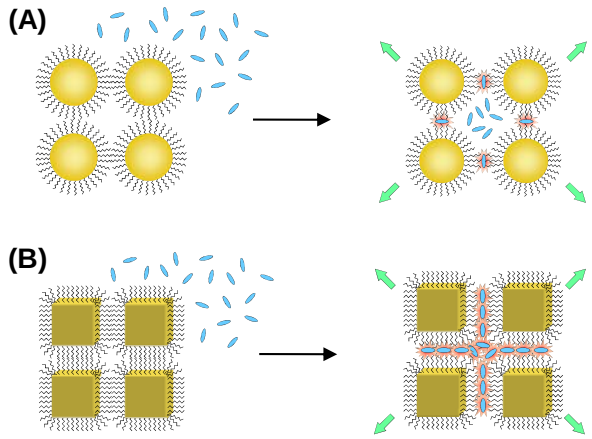

Scheme S1. Highly idealized schematic illustration of the swelling-based sensing mechanism for films of **(A)** spherical MCNPs and **(B)** cubic MCNPs.

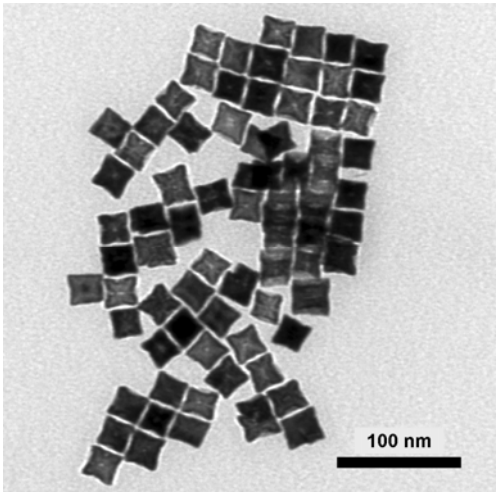

Fig. S1 Representative TEM images of cubic ODA-capped cubic Pt NPs with a characteristic dimension of 17±0.5 nm. The NPs are quite uniform in size and shape.

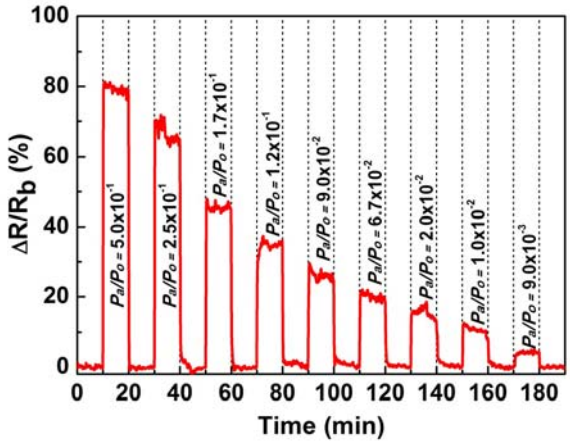

Fig. S2 Representative sensor response of ODA-capped *cubic* Pt NP films to octane vapor at successively decreased P_a/P_o values.

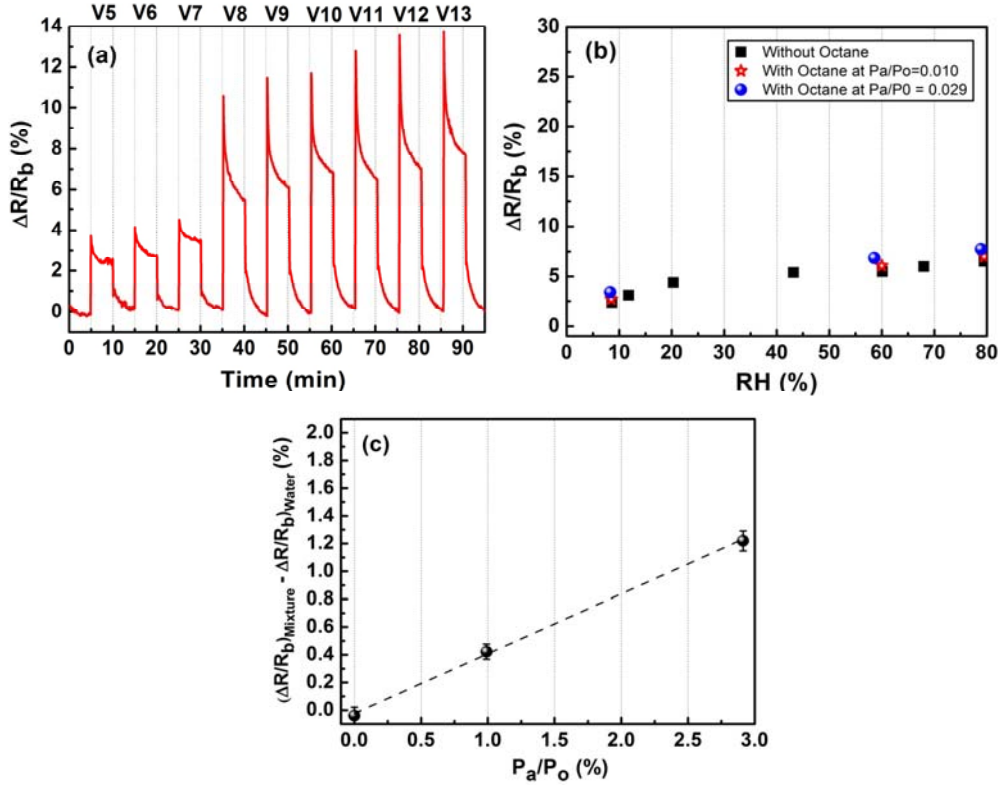

Fig. S3 **(a)** Response versus time of the ODA-Pt *cubic* NP sensor, obtained with a vacuum setup, to octane-water mixtures in air: *V5* to *V13,* respectively. The different compositions of the mixtures are listed in Table S1. **(b)** Steady state $\Delta R/R_b$ responses of the ODA-Pt *cubic* NP sensor obtained the vacuum setup to air mixtures of water vapor in the RH range of 8%-81% without octane vapor (black squares), with octane vapor at P_a/P_o=0.010 (red stars) and with octane vapor at P_a/P_o=0.029 (blue balls). **(c)** Calculated average $(\Delta R/R_b)_{Mixture}$-$(\Delta R/R_b)_{Water}$ versus the octane P_a/P_o of the different mixtures tested in the vacuum setup . $(\Delta R/R_b)_{Mixture}$-$(\Delta R/R_b)_{Water}$ for a given mixture was calculated by subtracting the $\Delta R/R_b$ response to water vapor from the overall $\Delta R/R_b$ response to the mixture. The dashed lines are fitted linear trend-lines. In the vacuum setup, the response climbed steeply and significantly overshot within the first seconds of analyte exposure, before reaching a steady state in less than five minutes, thereby allowing shorter measurement times. The overshoot at the beginning of the response became more substantial as the RH increased. When the vacuum was retrieved, there was a sudden drop in resistance followed by a gradual resistance decline, which reached baseline resistance in less than five minutes. The error bars in Fig. S3 is at the length of the symbols.