Electronic Supplementary Information

3D Hybrid Networks of Gold Nanoparticles: Mechanoresponsive Electrical

Humidity Sensors with On-Demand Performances

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1. Size distribution of as-synthesized AuNPs (Dynamic light scattering)



Figure S1: Dynamic light scattering measurements showing the size distribution of the synthesized AuNPs.

2. Supplementary SEM images of 3D AuNPs networks-based devices



Figure S2: SEM images of 3D AuNPs networks bridging gold electrodes in a humidity sensing device (the images shows the uniformity of the drop-cast films obtained with our optimized dual-step procedure).



3. Supplementary electrical data on AuNPs networks-based devices

Figure S3: Two-terminal I-V measurements of electrical devices based on bare AuNPs (Black), AuNPs-TEG (Red) and AuNPs-HEG (Blue) networks.



Figure S4: Relation between measured two-terminal electrical resistance and the nominal fully elongated chain length of the employed ligand showing exponential trend.



Figure S5: Two-terminal I-V measurements of electrical devices based on bare AuNPs, AuNPs-TEG networks and AuNPs-HEG networks in the temperature range between 80 and 300 K showing limited modulation of the device's characteristic upon modification of the temperature.



Figure S6: Evolution of two-terminal electrical resistance with temperature for AuNPs-HEG networks.

4. Supplementary characterizations of AuNPs networks-based humidity sensors



Figure S7: Measurements of response speed, reversibility and stability of AuNPs-TEG humidity sensing devices (constant bias applied = 0.5 V, low humidity ~ 30%, high humidity ~ 70%).



Figure S8: Measurements of response speed, recovery time, reversibility and stability of AuNPs-TEG humidity sensing devices (constant bias applied = 500 mV low humidity ~ 30%, high humidity ~ 70%).