Electronic Supporting Information

Figure S1

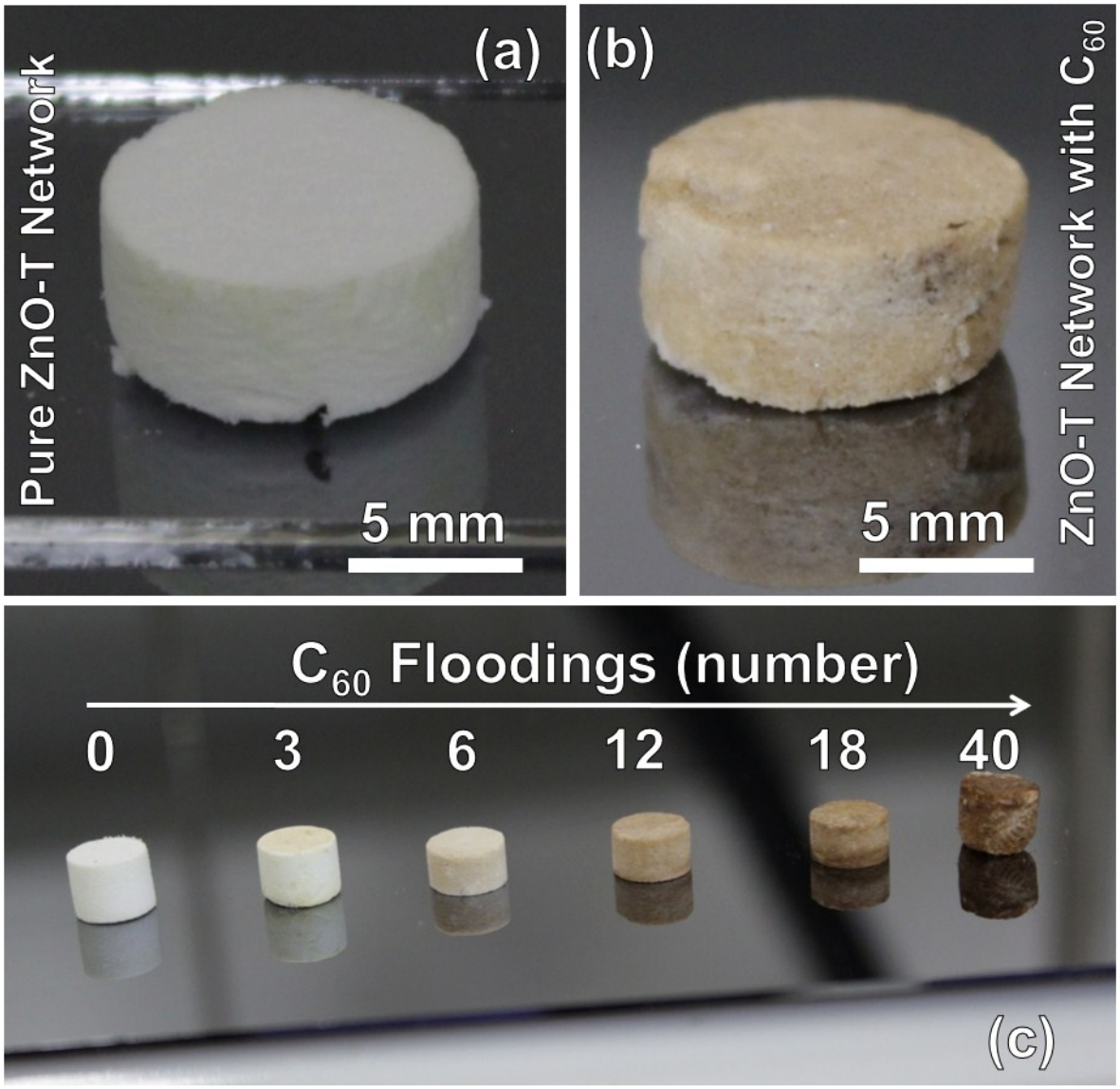

Figure S1: Camera images of the ZnO pellet before drop casting (a), and after 5 C_{60} floodings (b). (c) Camera images of ZnO samples demonstrating their color change with increasing the amount of C_{60} flooding times: 0-40 floodings (left to right).

Figure S2

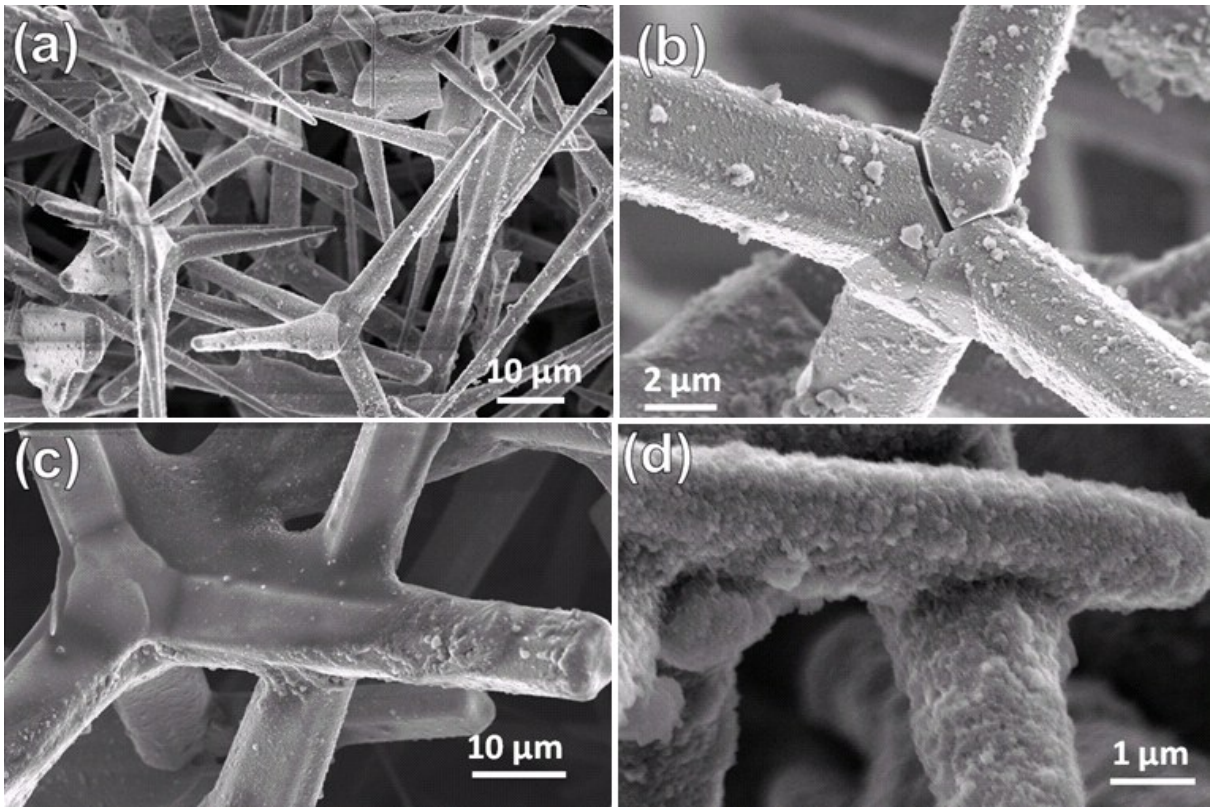

Figure S2: SEM images of ZnO networks after 10 floodings (a,b) and 40 floodings (c,d). After 40 drop-casting cycles agglomerations of C_{60} are observed at the interconnection points between single tetrapods.

Figure S3

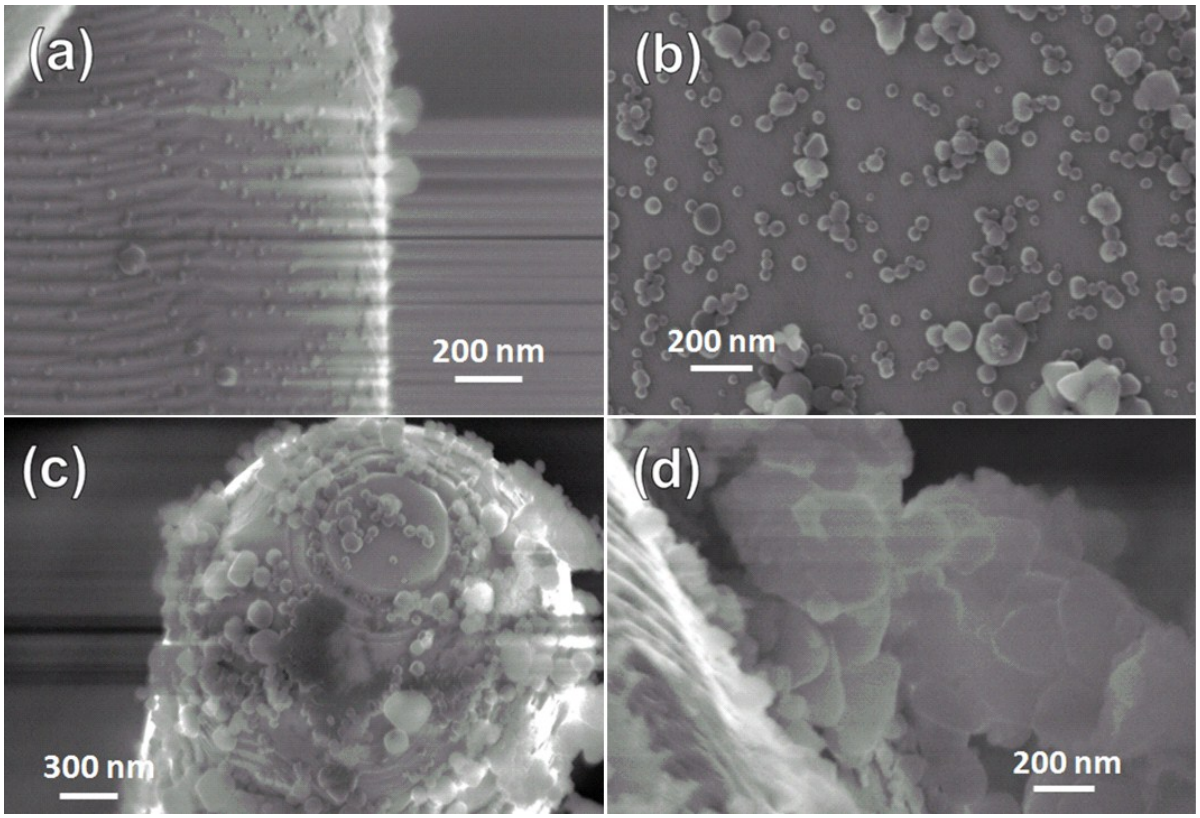

Figure S3: SEM images (higher magnification) of ZnO-T surface with C_{60} after 3 floodings (a), 10 floodings (b), 40 floodings (c) and 60 floodings (d). For the low number of coatings with C_{60} (3 and 10, a and b, respectively) isolated C_{60} clusters are observed. By higher number of floodings the clusters tend to join forming a layer at the ZnO surface.

Figure S4

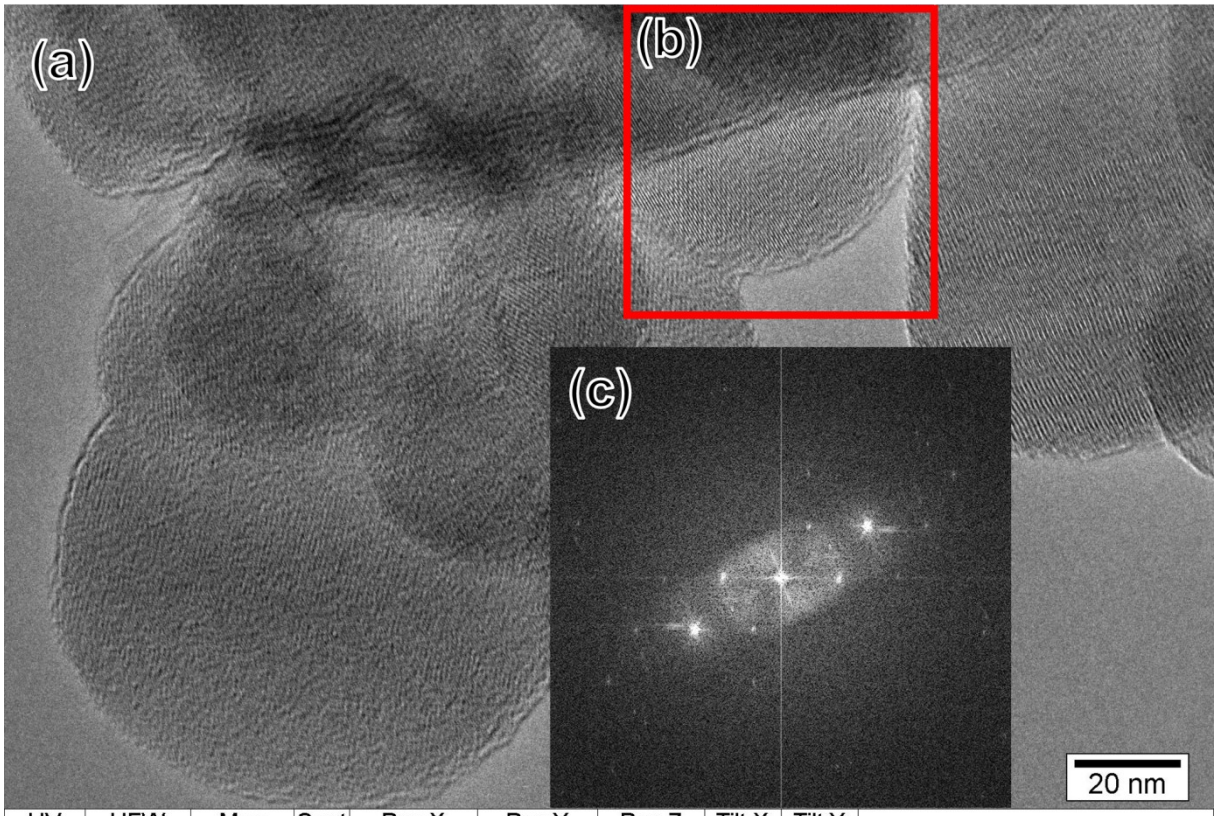

Figure S4: (a) TEM higher magnification image with an overview on fullerene clusters. From the red marked region (b) a FFT pattern was simulated (c), which indicates the crystallinity of the clusters. Also distinctive are the lines indicating the rows of the fullerene aligned into crystals.

Figure S5

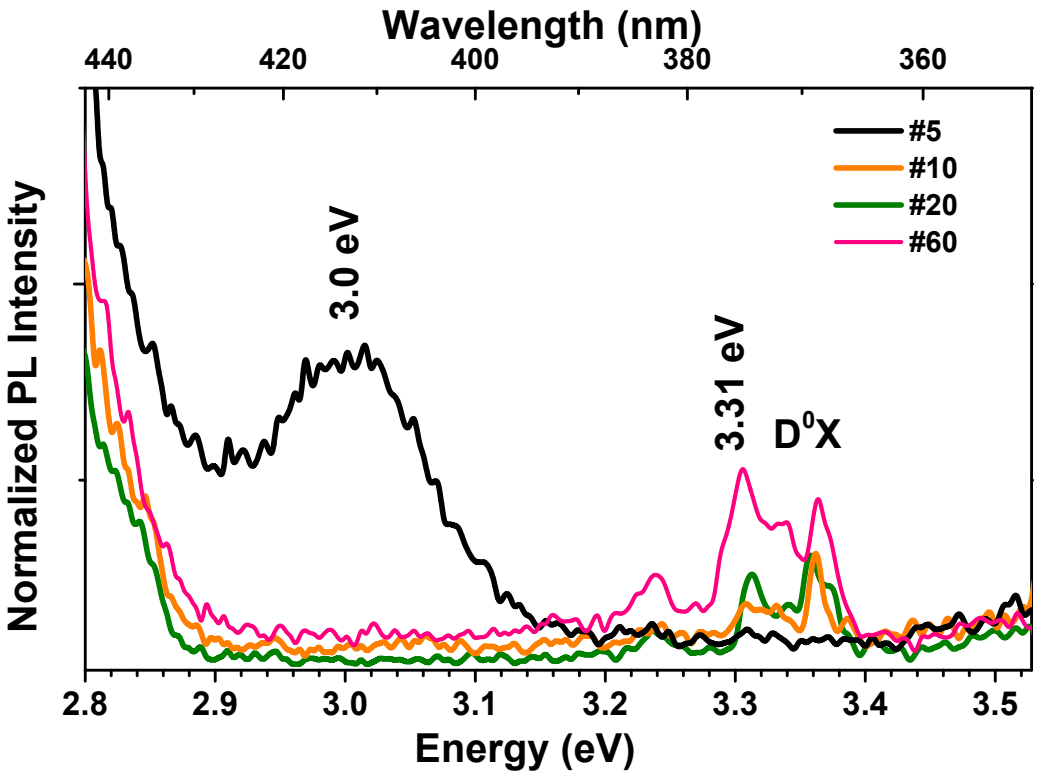

Figure S5: 14 K near band edge recombination (NBE) of the ZnO-T-C_{60} composites. The spectra were obtained with above ZnO bandgap excitation.

Figure S6

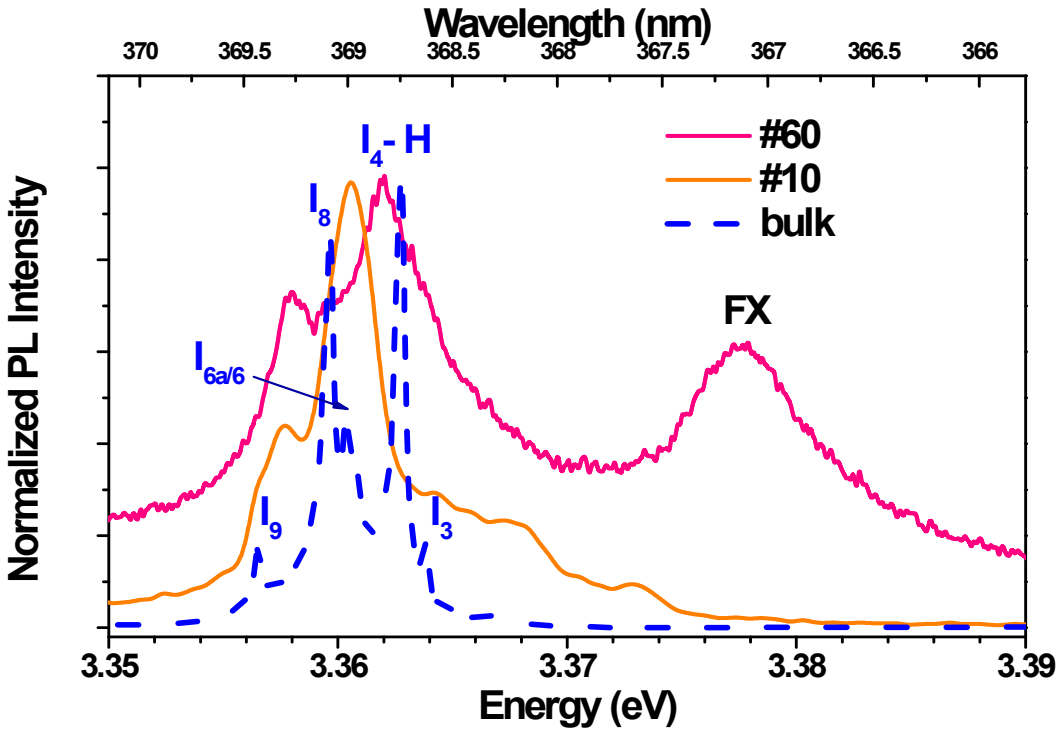

Figure S6: 14 K near band edge recombination (NBE) of the ZnO-T-C_{60} composites: FX and bound excitons spectral regions. The spectra were obtained with above ZnO bandgap excitation.

Figure S7

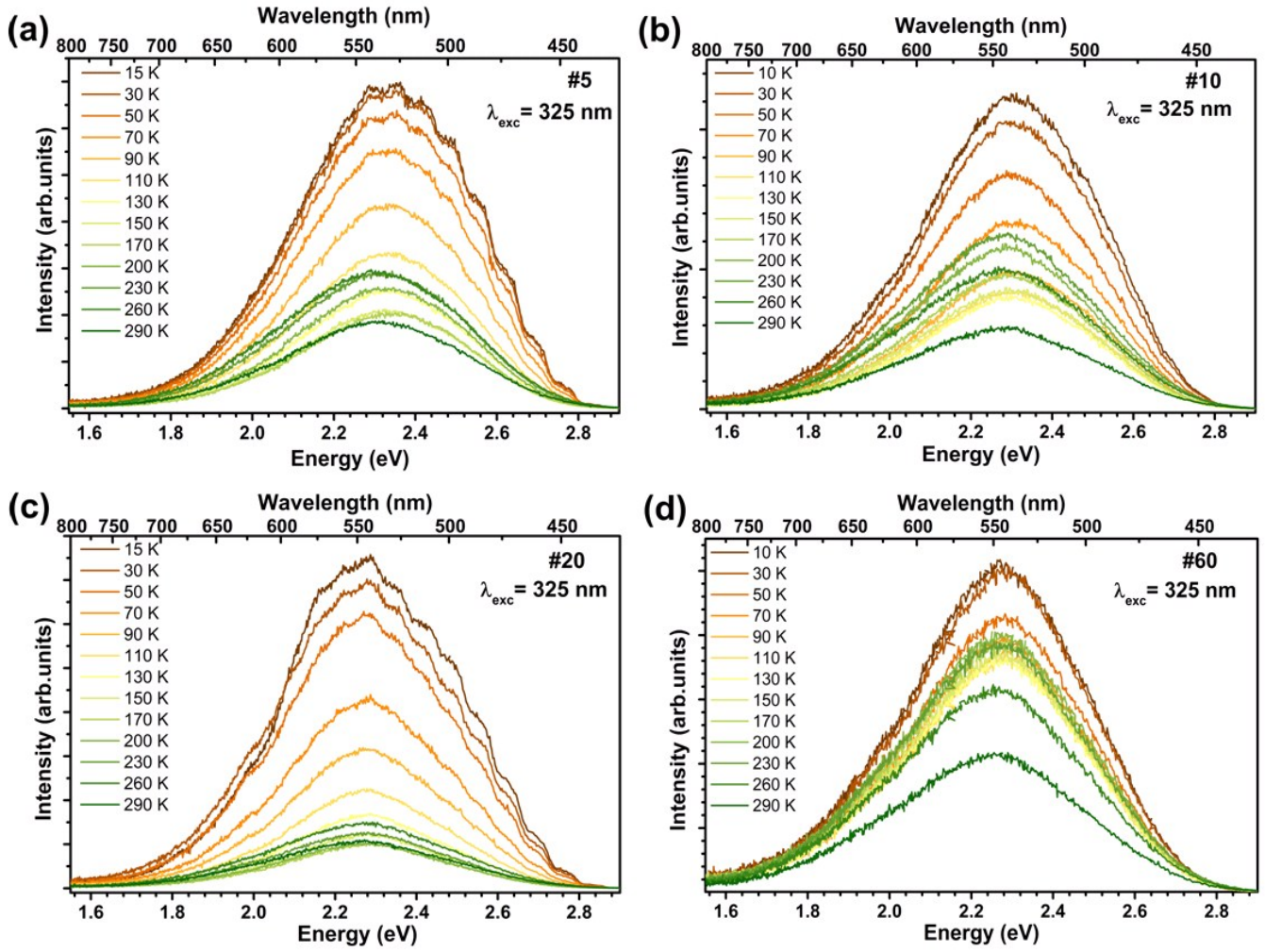

Figure S7: Temperature dependent PL spectra of the ZnO-T-C_{60} composites. The spectra were obtained with above ZnO bandgap excitation in the interval range 10 K - RT.

Figure S8

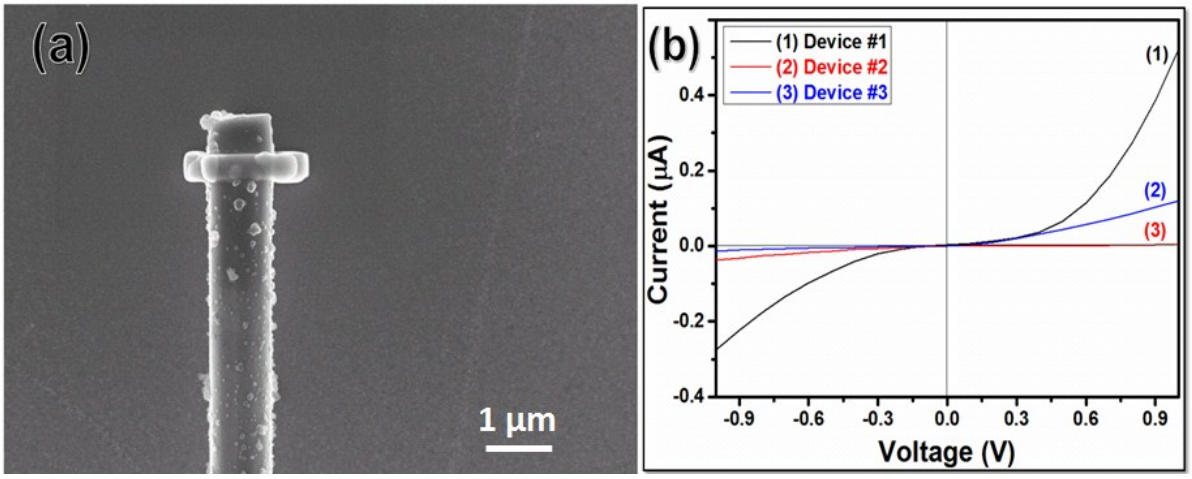

Figure S8: (a) The high magnification SEM image of Pt contacts on a nano-device 1 of a ZnO microtetrapod covered with 10 floodings of C_{60} aqueous solution. (b) Current – voltage characteristics of devices fabricated based on individual ZnO-T-C_{60} arms in the dark at room temperature.

Figure S9

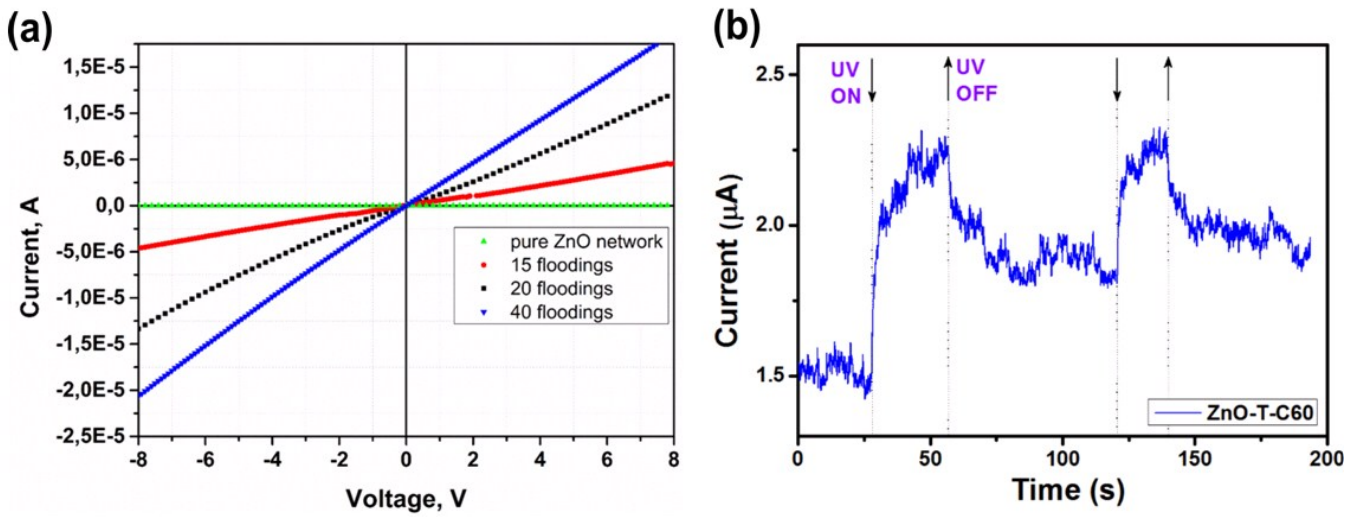

Figure S9: (a) Electrical characterization of a macroscopic template of a ZnO network and of ZnO-T-C_{60} networks with different number of floodings. Starting with a reference network (pure ZnO), followed by networks with coatings of 15, 20 and 40 floodings of C_{60}. (b) Dynamic response of ZnO-T-C_{60} networks to illumination with UV light at room temperature.

Figure S10

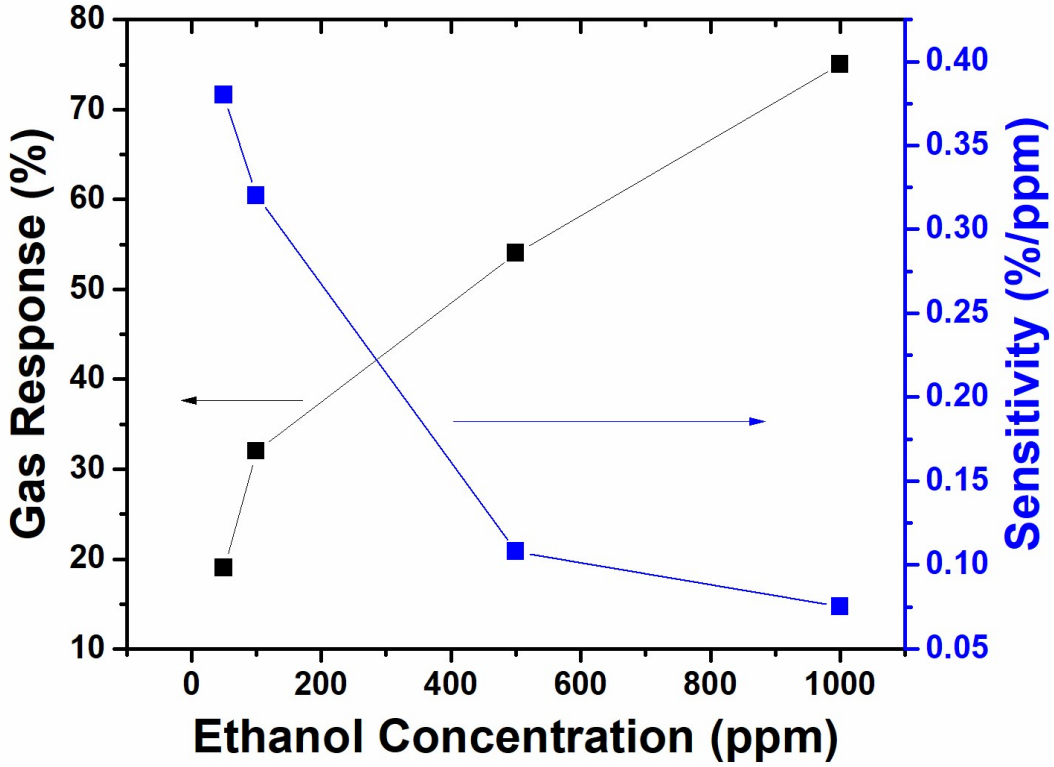

Figure S10: Dependence of room temperature gas response (%) and sensitivity (%/ppm) of Device #3 versus concentration of ethanol vapors (ppm).

Figure S11

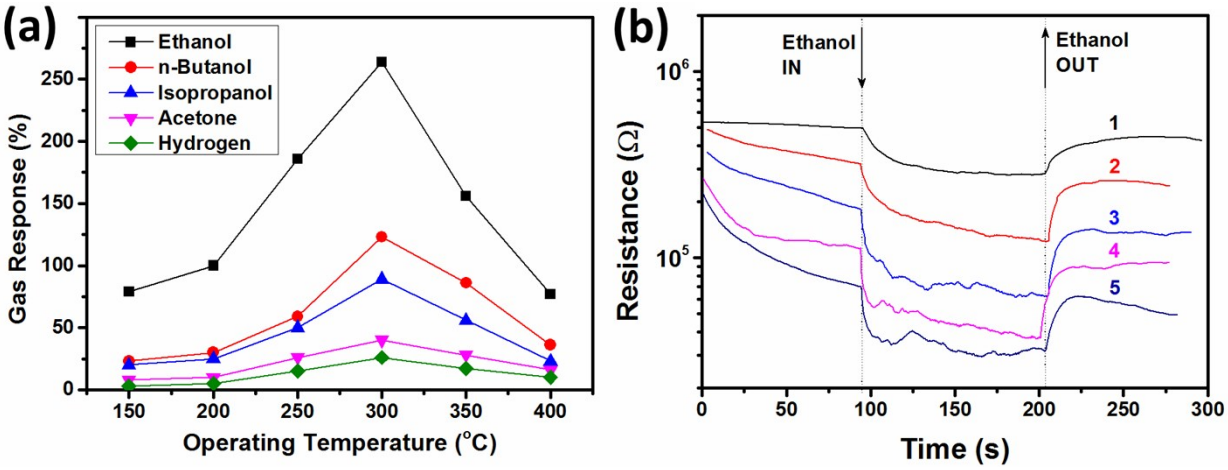

Figure S11: (a) The gas response versus operating temperature of ZnO-T-C_{60} networks. (b) The dynamic gas response to five time exposures under ethanol vapors at 300 °C operating temperature of ZnO-T-C_{60} networks.