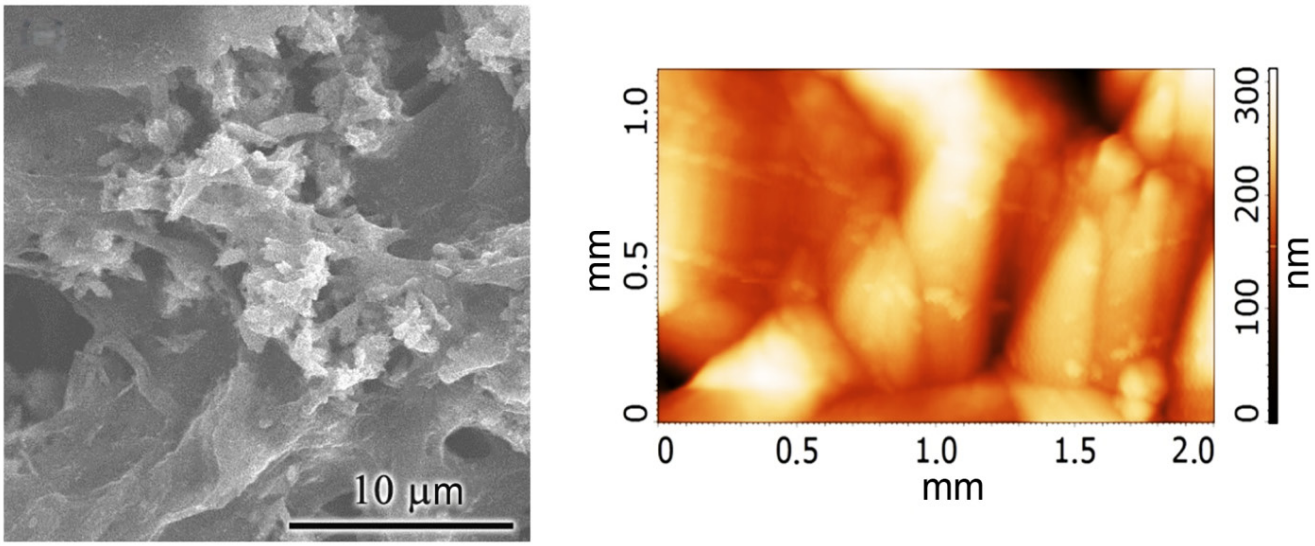
Supplementary material

Figure S1 presents scanning electron microscopy (SEM) and atomic force microscopy (AFM) images of a 2L-thick sensor film printed on paper.



a b

Fig. S1. (Color online) SEM (a) and AFM (b) images of 2L sensor 2D-printed on paper.

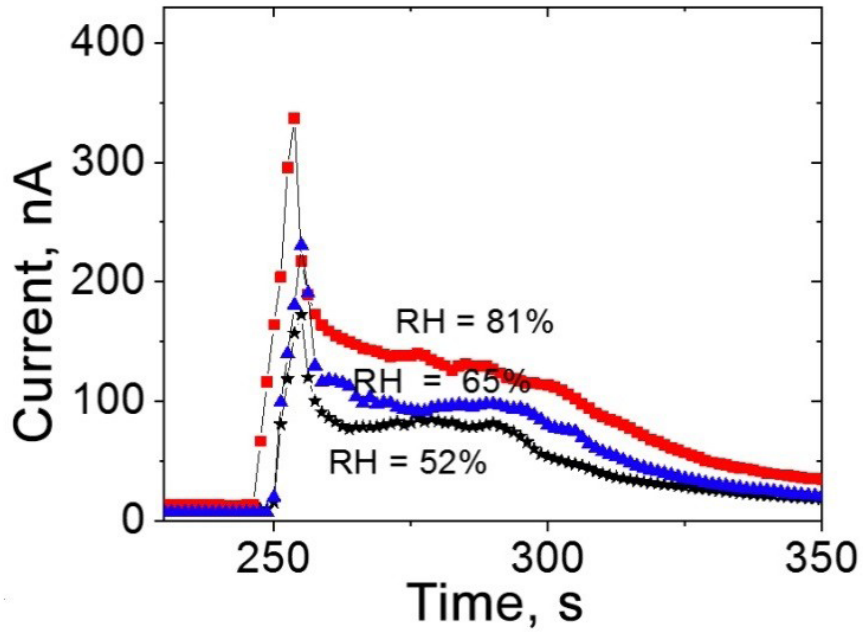


Fig. S2. (Color online) Response of sensor to exhalation for different moisture contents in vapors (the humidity was measured with specialized sensor).

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Figure S3 shows the results for the sensor response to a finger touch or pressure. We assume that skin sweat plays a significant role in the sensory response to touch or pressure because using a pressure stick significantly weakened the response. This combination of responses to pressure and humidity makes it possible to use the sensors, for example, for a keyboard or creation of artificial skin.

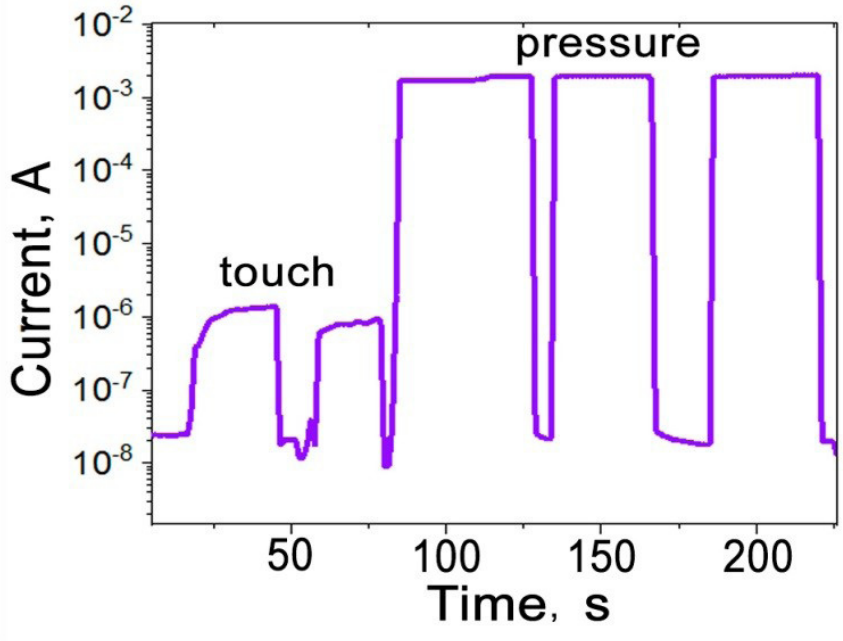
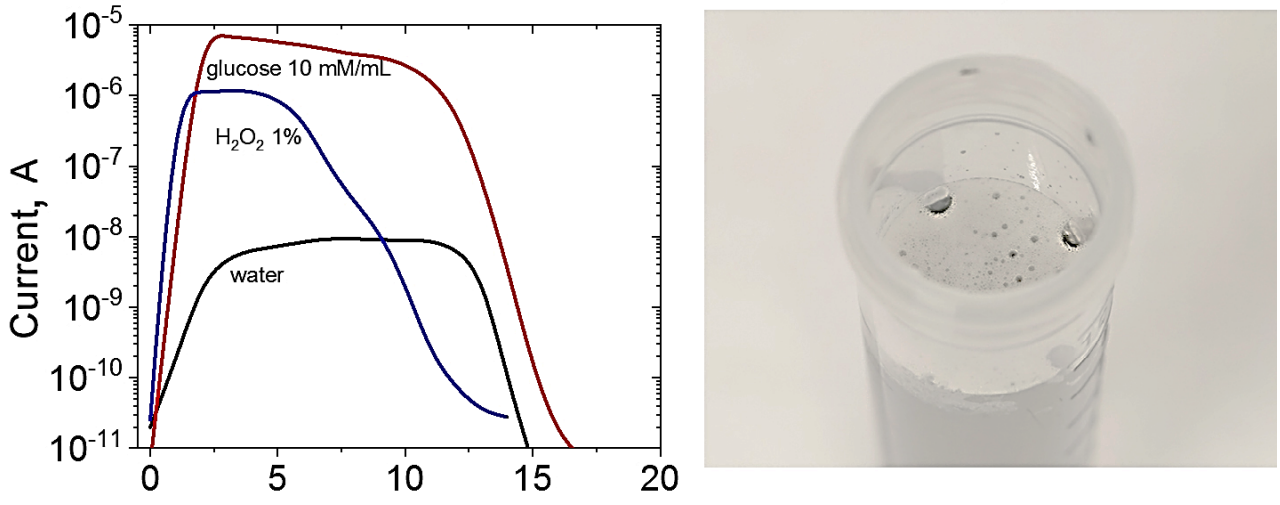


Fig. S3. Using sensor of graphene:PEDOT:PSS on paper as touch sensor: response of sensor to finger touch and finger pressure.

The sensor response to hydrogen peroxide is shown in Fig. S4. It is evident that the sensor demonstrates high sensitivity to such solution. When graphene flakes are added to peroxide solution, a violent reaction with the formation of hydrogen bubbles occurs.



a b

Fig. S4. (Color online) Time dependence of response of spunlace sensors (3L) to application of droplet of various solutions (a). Optical image of bubble formation on surface of glucose solution at addition of graphene flakes to it; bubble formation is associated with glucose oxidation reaction with arise of hydrogen peroxide (b).