

## Supporting Information (SI)

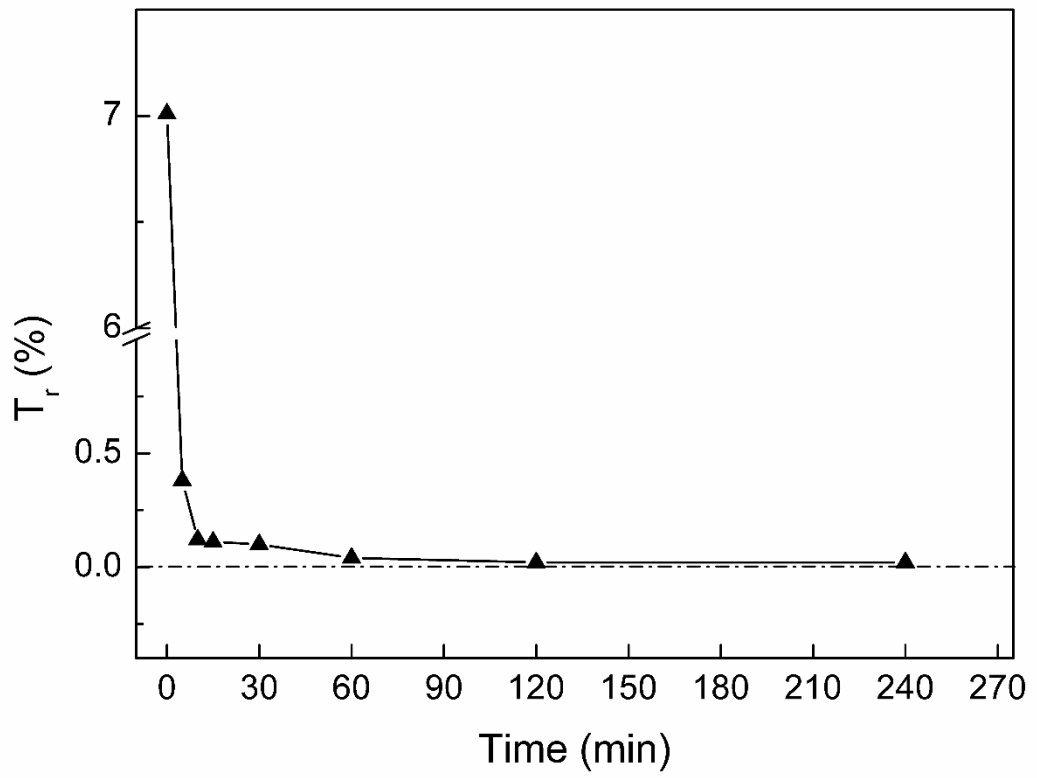
### **Smart cellulose/graphene composites fabricated by *in situ* chemical reduction of graphene oxide for multiple sensing applications**

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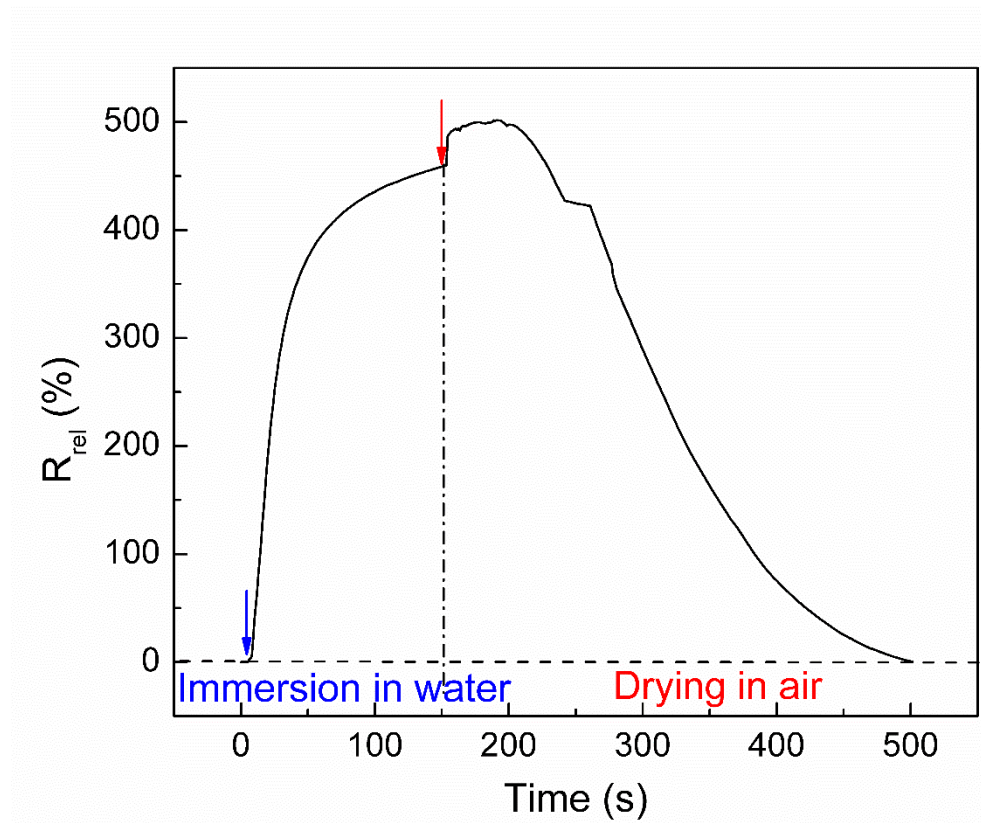
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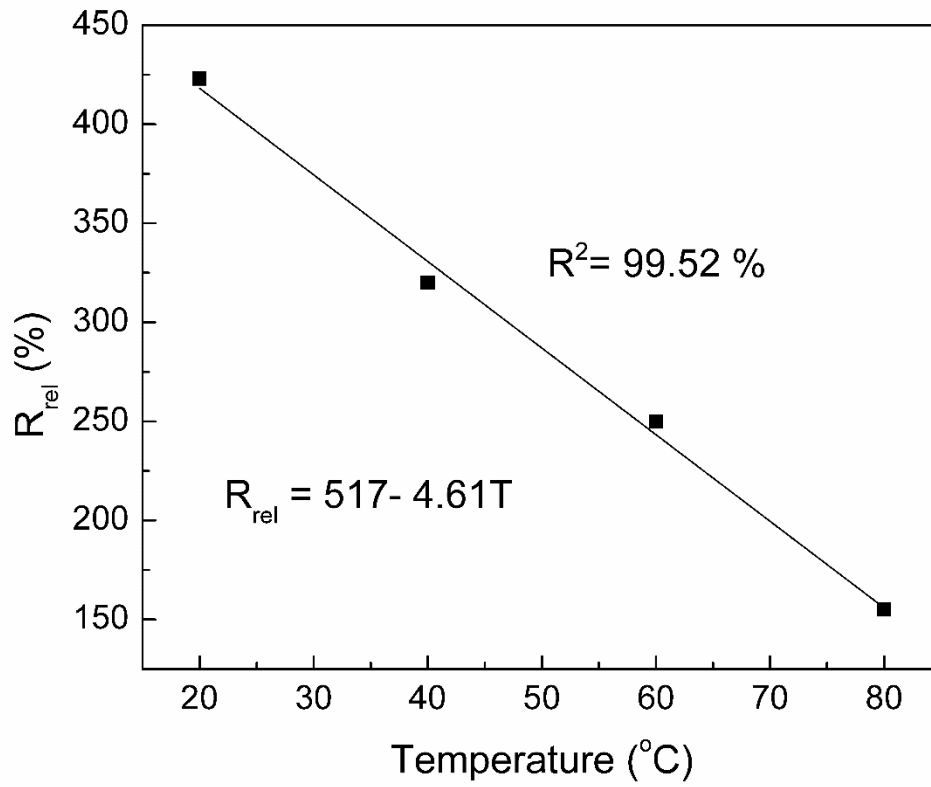
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**Figure S1.** Dependence of the optical transmittance ( $T_r$ , %, 800 nm) of the rGO (5 wt%)/cellulose composite films on the time of reduction.



**Figure S2.** Relative resistance change ( $R_{rel}$ ) of rGO (5 wt%)/cellulose composite film during immersion/drying (150 s/350 s) cycle in water at 20 °C.



**Figure S3.**  $R_{rel}$  after 150 s immersion of the rGO (5 wt%)/cellulose composite into water depending on water temperature.

Table S1 Mechanical properties (tensile test) of films with different GO or rGO contents. The standard deviations are given in brackets.

Sample	$\sigma_b$ (MPa)	E (GPa)	$\varepsilon_b$ (%)
Cellulose	43.5 (3.7)	5.2 (0.71)	4.4 (0.78)
2 wt% GO/cellulose	52.5 (5.7)	6.2 (0.46)	3.8 (0.70)
3 wt% GO/cellulose	52.9 (7.7)	7.0 (0.72)	3.1 (0.34)
5 wt% GO/cellulose	54.9 (3.0)	7.4 (0.41)	2.4 (0.21)
8 wt% GO/cellulose	53.3 (4.1)	7.1 (0.51)	1.7 (0.35)
2 wt% rGO/cellulose	55.6 (5.5)	6.9 (0.62)	2.8 (0.44)
3 wt% rGO/cellulose	56.3 (6.9)	7.4 (0.78)	2.7 (0.24)
5 wt% rGO/cellulose	57.5 (4.1)	7.6 (0.53)	2.6 (0.24)
8 wt% rGO/cellulose	56.2 (3.6)	7.3 (0.45)	1.6 (0.31)

Table S2 Results of Raman analysis of films with different GO or rGO contents.

Sample	D-band ( $\text{cm}^{-1}$ )	G-band ( $\text{cm}^{-1}$ )	D(I)/G(I)-ratio
3 wt% GO/cellulose	1349	1604	1.07
5 wt% GO/cellulose	1349	1603	1.01
8 wt% GO/cellulose	1349	1602	1.10
3 wt% rGO/cellulose	1351	1602	1.54
5 wt% rGO/cellulose	1350	1602	1.46
8 wt% rGO/cellulose	1350	1601	1.57