Supplementary Information

Reduced Graphene Oxide as Water, Carbon Dioxide and Oxygen Barrier in Plasticized Poly(vinyl chloride) Films

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**Table S1.** Atomic percentages (%) of elements in GO and RGO determined with EDXA.

|      | C       | O       | Si       | S       | K       | Mn      | I       | C:O ratio |
|------|---------|---------|----------|---------|---------|---------|---------|-----------|
| GO   | 56 ± 1  | 42.3 ± 0.4 | 0.20 ± 0.01 | 1.12 ± 0.03 | 0.16 ± 0.02 | 0.11 ± 0.02 | -       | 1.32 ± 0.04 |
| RGO  | 79 ± 2  | 12.4 ± 0.2 | 0.33 ± 0.04 | -       | -       | -       | 8.2 ± 0.1 | 6.4 ± 0.3  |

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Fig. S1. Image of the 10 µm thick RGO film. We straightened and cut the film to 10 mm × 10 mm before we applied it as a barrier layer in the plasticized PVC films.

Fig. S2. The FTIR spectra of (a) GO and (b) RGO.

References to the vibrational bands: G. Socrates, Infrared and Raman Characteristic Group Frequencies, Tables and Charts, 3rd ed., John Wiley & Sons, Ltd: Chichester, 2001
Fig. S3. XRD patterns of (a) GO and (b) RGO.

Fig. S4. Water contact angles of (a) GO (58±3°) and (b) RGO (95±1°).
Fig. S5. Oxygen diffusion through the plasticized PVC membrane with (▲) and without (●) the RGO barrier layer. We carried out the control experiment (■) in the absence of a plasticized PVC membrane between the source and the receiving compartments of the oxygen measuring cell. Both compartments were filled with deionized water in all measurements.