Chemical functionalization of arbitrary substrates for biosensing applications using large area CVD graphene.

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We report, a new, impressively simple pathway [1] for the functionalization of arbitrary substrates. The substrates are functionalized by the transfer of a nm-thin graphene layer, covalently functionalized by the reduction of *p*-(N-Maleimido) benzenediazonium cations [2]. Even flexible substrates like PTFE tape were functionalized. Infrared Ellipsometry measurements and Raman backscattering confirm both the presence of the desired residues on the graphene prior to and after transfer, as well as the covalent nature of the bonds. Furthermore, optical simulations, as well as infrared atomic force microscopy (IR-AFM) were applied to determine the thickness of the functional layer prior and after transfer. The transfer procedure was shown to have almost no influence on the thickness of the functionalization. Combined with the diversity of p-substituted diazonium salts as precursors [3], the possibility of transferring functionalized graphene sheets to arbitrary substrates paves the way for new, feasible types of (bio)sensing structures.

References

[1] Rösicke, F. et al. (2016) *submitted*.
[2] Rösicke, F., Gluba M.A., et al., Electrochemistry Communications, 57(1), 52–55 (2015).
[3] Zhang, X., Rösicke, F., et al. Zeitschrift für Physikalische Chemie, 228(4–5), 557–573. (2014)

Figures

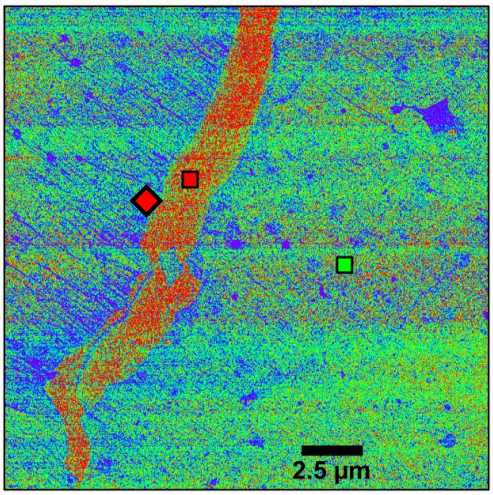

Figure 1: AFM-IR map of p-(N-Maleimido)phenyl functionalization on graphene, transferred to a gold surface.

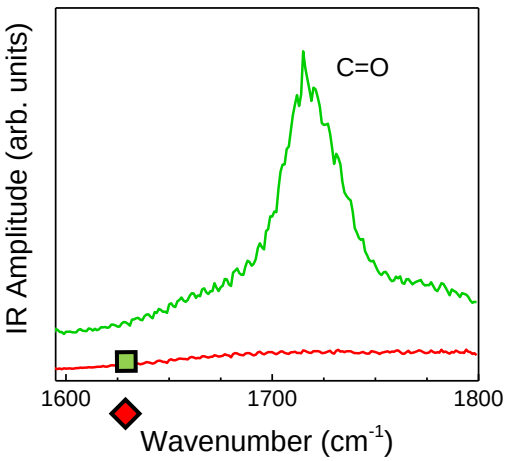

Figure 2: Spectra acquired in the marked boxes in Fig. 1