Determination of amino groups on functionalized graphene oxide for polyurethane nanomaterials: XPS quantitation vs. functional speciation

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Supplementary material

Content:

S1. Sample characterization

S2. Calibration plot, Absorption spectra of AO7

S3. References

S1. *Sample characterization*

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The quality of the oxidation of graphene has been proved by X-ray diffraction. The diffraction line was observed at 11.0° (see Fig. S1.), the result corresponds to the literature.[1,2] The GO-NH_2 prepared from GO show peaks where a strong peak at 11.0° disappeared and broad peaks with a low intensity appear at 8.8°, 24.6° (Fig. S1.). The partial reduction of GO is shown by presents of a broad peak at 24.6°.[3] The second broad peak at 8.8° proved the amination of GO where the interlayer distance is larger (about 1.00 nm) than for GO because of the functional group exchange.

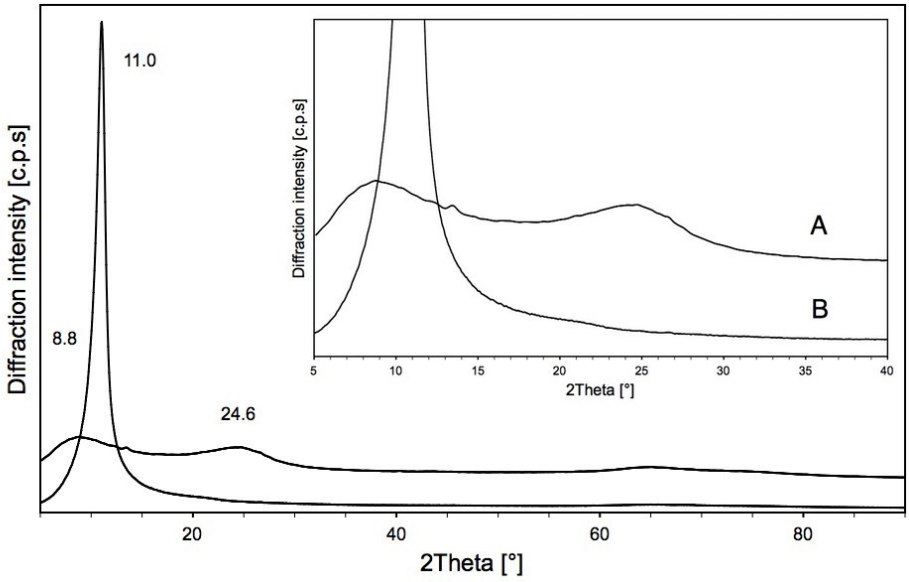

Fig. S1. XRD patterns of prepared samples: A) GO-1; B) GO-3

The Raman spectra of GO and GO-NH_2 are shown in Fig. S2. The Raman spectrum can show the quality of the oxidation. The strong bands D and G are corresponding to the breathing mode of C-sp^2 atoms in ring at 1352 cm^{-1} and the in-plane bond stretching motion of C-sp^2 atoms at 1598 cm^{-1}.[4] In this case there was no shifting of D or G band after amination. Anyway, the appearance of an intense D band at 1352 cm^{-1} indicate well done oxidation of graphene. The 2D band at 2705 cm^{-1} is mostly featureless for GO, therefore we have omitted from the spectra.

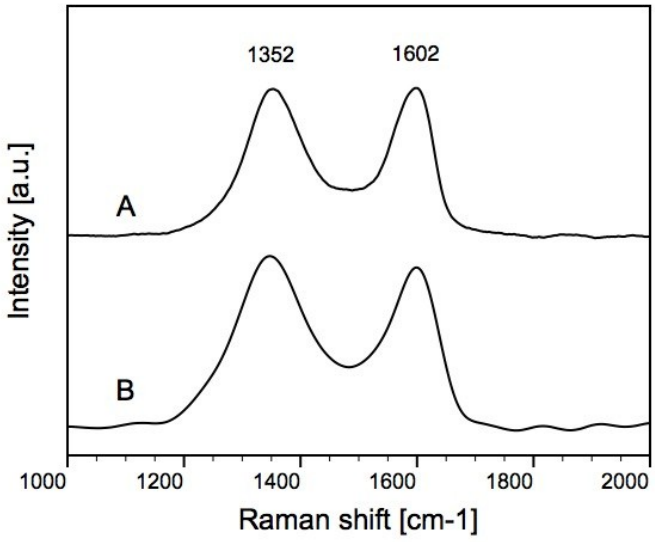

Fig.S2.Raman spectra of prepared samples: A) GO-3) and B) GO-1

S2. *Calibration plot of AO7 in BRB*

Amount of free AO7 after adsorption experiment was evaluated by equation obtained from linear regression of calibration plot $y = 18062x + 0.0368$, with good correlation coefficient ($R^2 = 0.9989$) and RSD < 3% as can be seen in Fig.S3. In the Fig.S4 it is shown the absorption spectrum of 6.5×10^{-5} mol/L AO7 in BRB (pH = 3.60). As can be seen in Fig. S4 there is only one absorption maximum at λ_{MAX} = 484 nm.

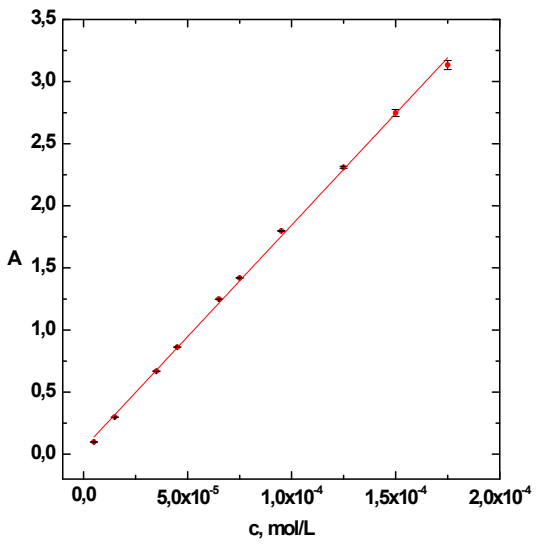

Fig. S3. Calibration plot of AO7 in BRB (pH = 3.60)

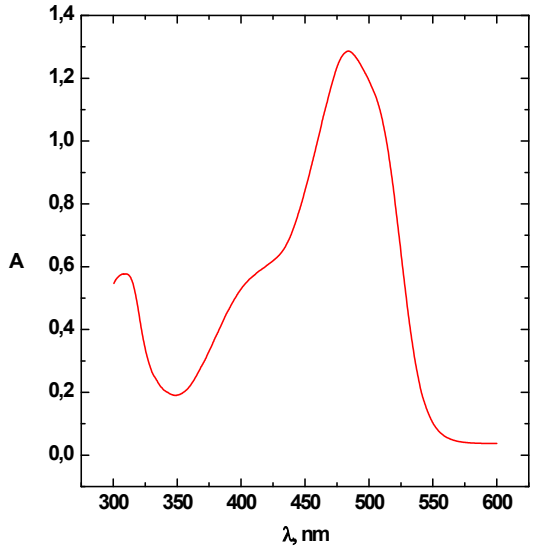

Fig. S4. Absorption spectrum of 6.5×10^{-5}mol/L AO7 in BRB (pH=3.60)

S3. *References*

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