Electronic Supplementary Material (ESI) for RSC Advances.

Valorization of cellulose and waste paper to graphene oxide quantum dots

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FTIR study of α-cellulose and CN

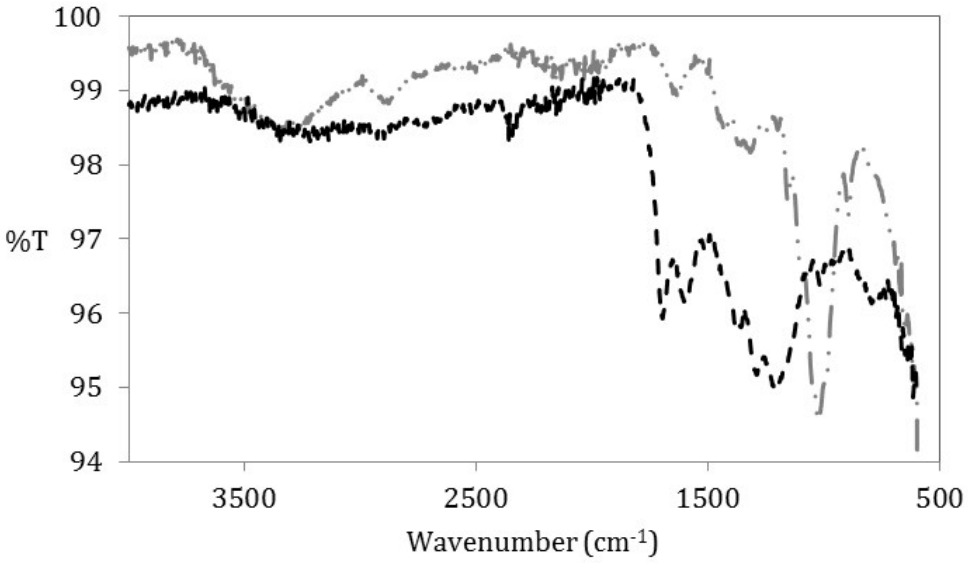

Figure S1. FTIR-spectra of α-cellulose (— ·) and CN (– –).

AFM study of bulk CN and GOQD

Surface character, average size and thickness of GOQD-60 were further studied and compared to CN. In figure 5, AFM images shows that CN consists of spherically shaped species in accordance with SEM. The sphere sizes were polydisperse with mainly larger particles in μm size. GOQD on the other hand were shown to consist of large sheets with a few bumps due to functional groups such as hydroxyl and carboxyl. Possibly, the dots overlapped due to strong interaction and formed larger domains of GOQD held together by intermolecular forces.

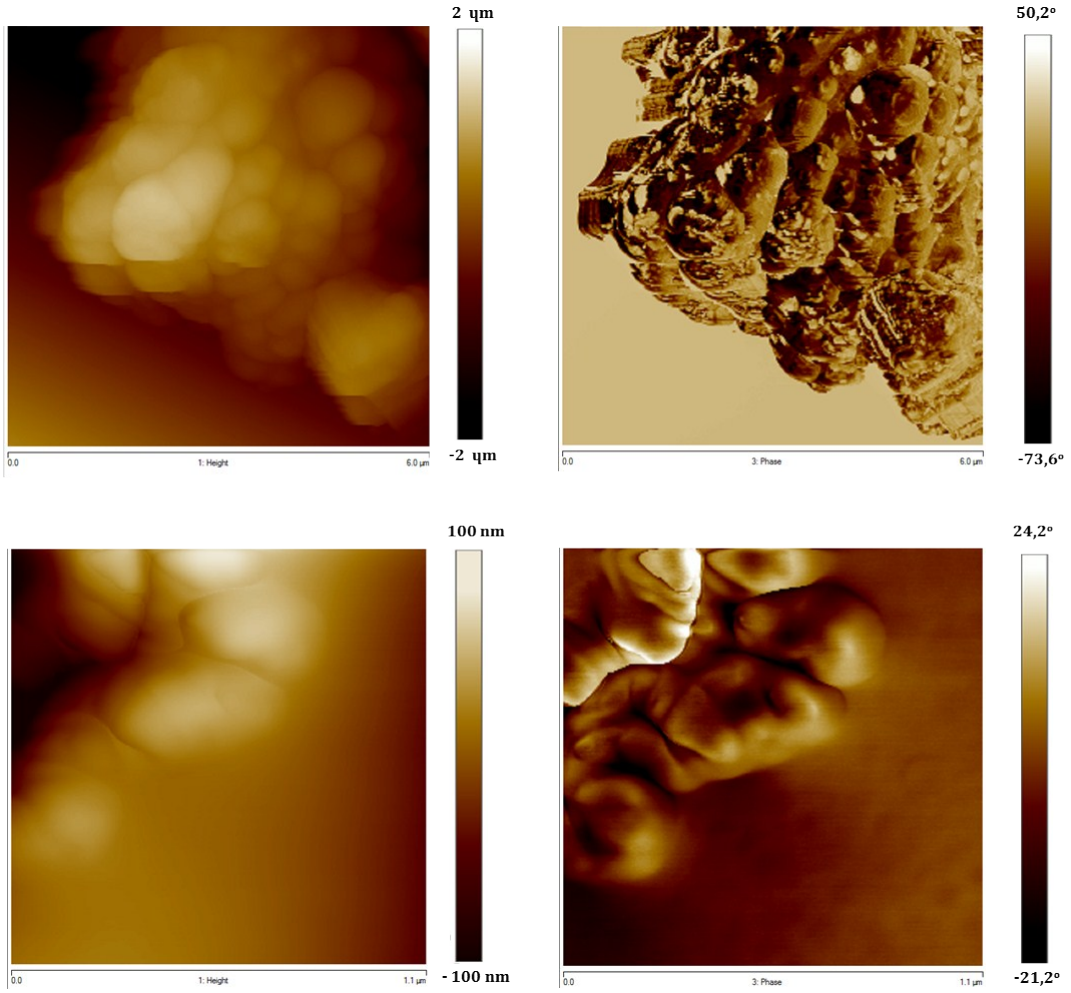

Figure S2. AFM images given in height and phase mode respectively of a-b) CN and c-d) GOQD-60 bulk solid form.

TGA studies

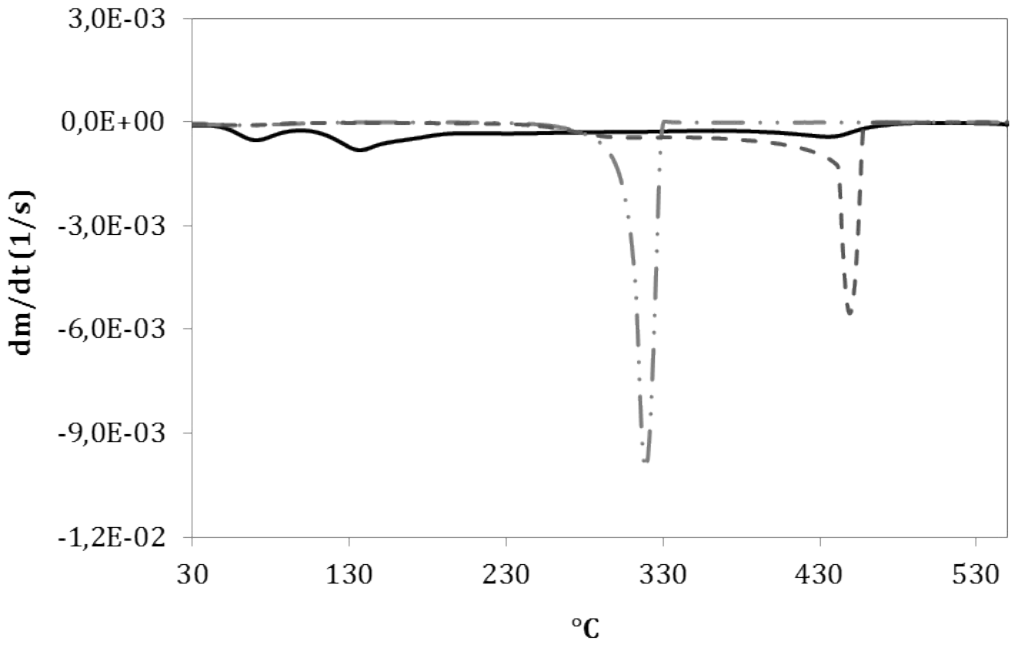

Figure S3. DTG curves of α-cellulose (— · ·), CN (– –) and GOQD -60 (——) in O_2 atmosphere.

TEM studies

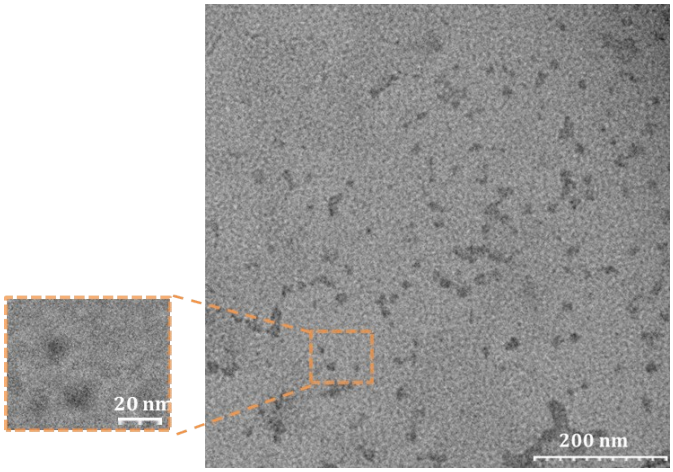

Figure S4. Sheets of GOQD-60 visualized by HR-TEM. The sample was prepared at a concentration of 0.05 mg/ml in deionized H_2O.

Optical and fluorescence properties

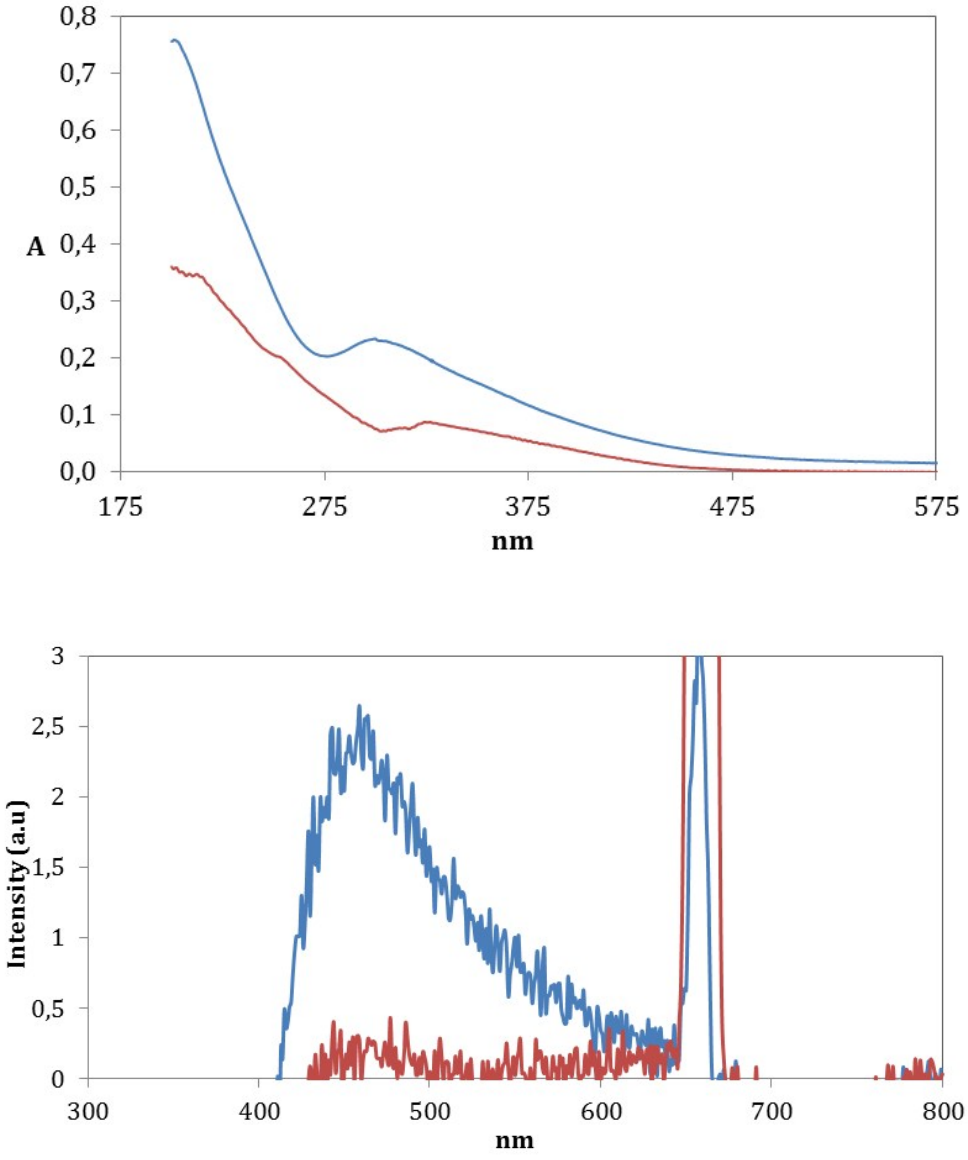

Figure S5. Optical (UV-Vis) (top) and fluorescence properties (below) of GOQD (0.05 mg/ml in deionized H_2O, exc. 330 nm) at different reaction times. GOQD-30 (blue), GOQD-60 (red).

FTIR and XRD studies of waste paper, CN and GOQD

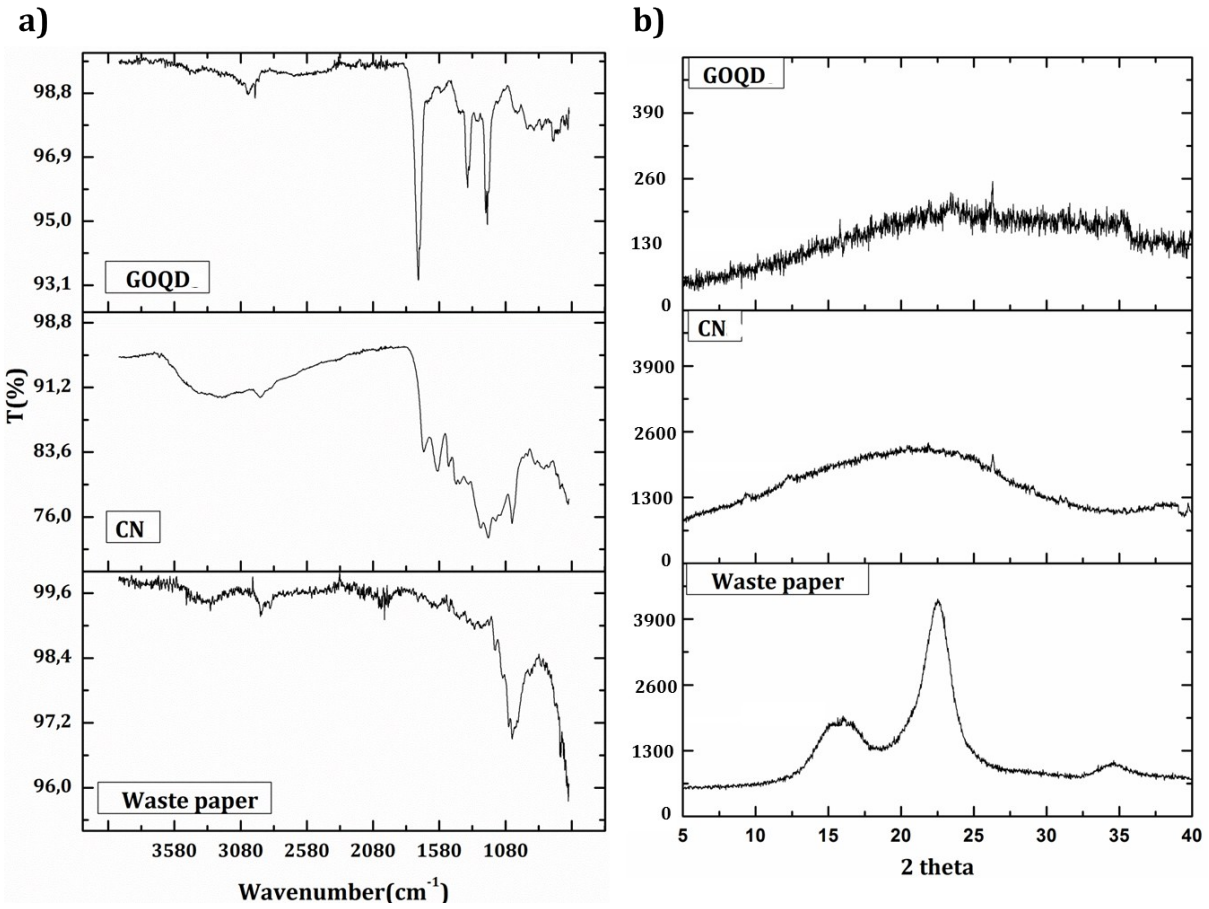

Figure S6. a) FTIR spectra and b) XRD spectra of waste paper, CN and GOQD-30.