Electronic Supplementary Material (ESI) for RSC Advances.

Electronic supplementary information

Surface chemistry of water-dispersed detonation nanodiamonds modified by atmospheric DC plasma afterglow

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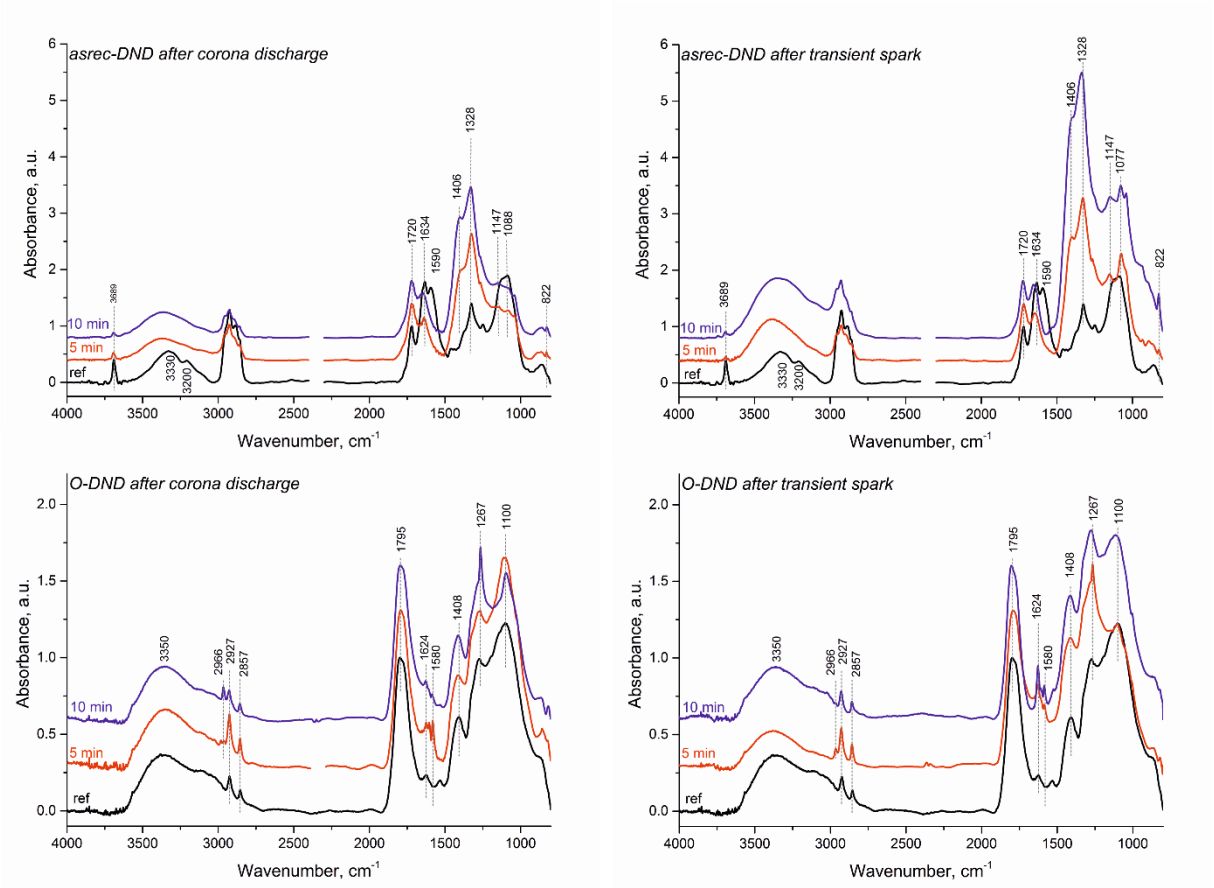


Fig. S1. FTIR spectra of asrec-DND and O-DND samples treated by corona and transient spark discharge afterglow. The spectra are obtained before drying in vacuum, samples were dried only on a hotplate prior to FTIR measurement. The spectra are normalized at carbonyl peak at 1720 cm^{-1} (1795 cm^{-1} for O-DND, respectively), which is stable in XPS. The spectra are stacked in the graphs for better clarity.

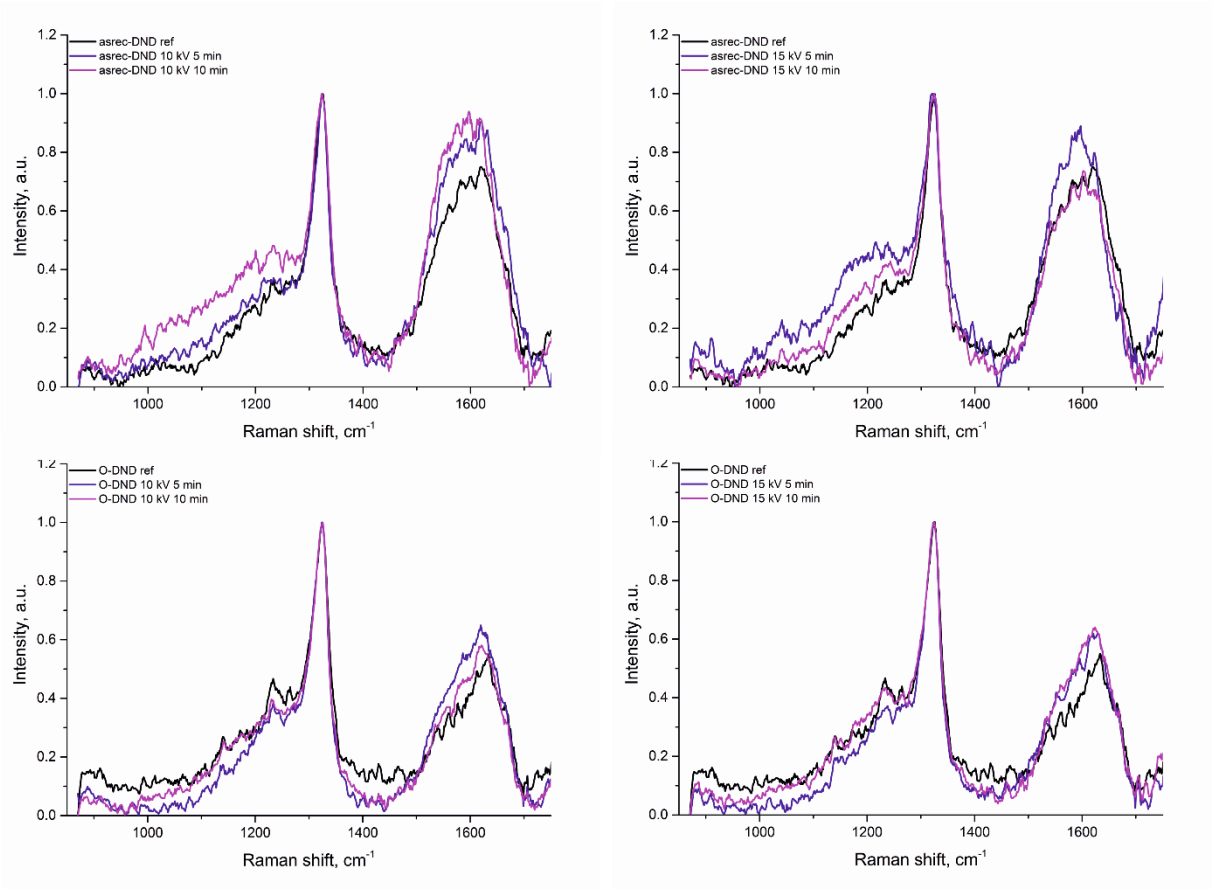


Fig. S2. Raman spectra of presented materials. Spectra are normalized at a D-peak centered at 1325 cm^{-1}. Hardly any difference is resolvable. Modification of all treated DNDs thus occurs on their surfaces with minimal impact on their core.

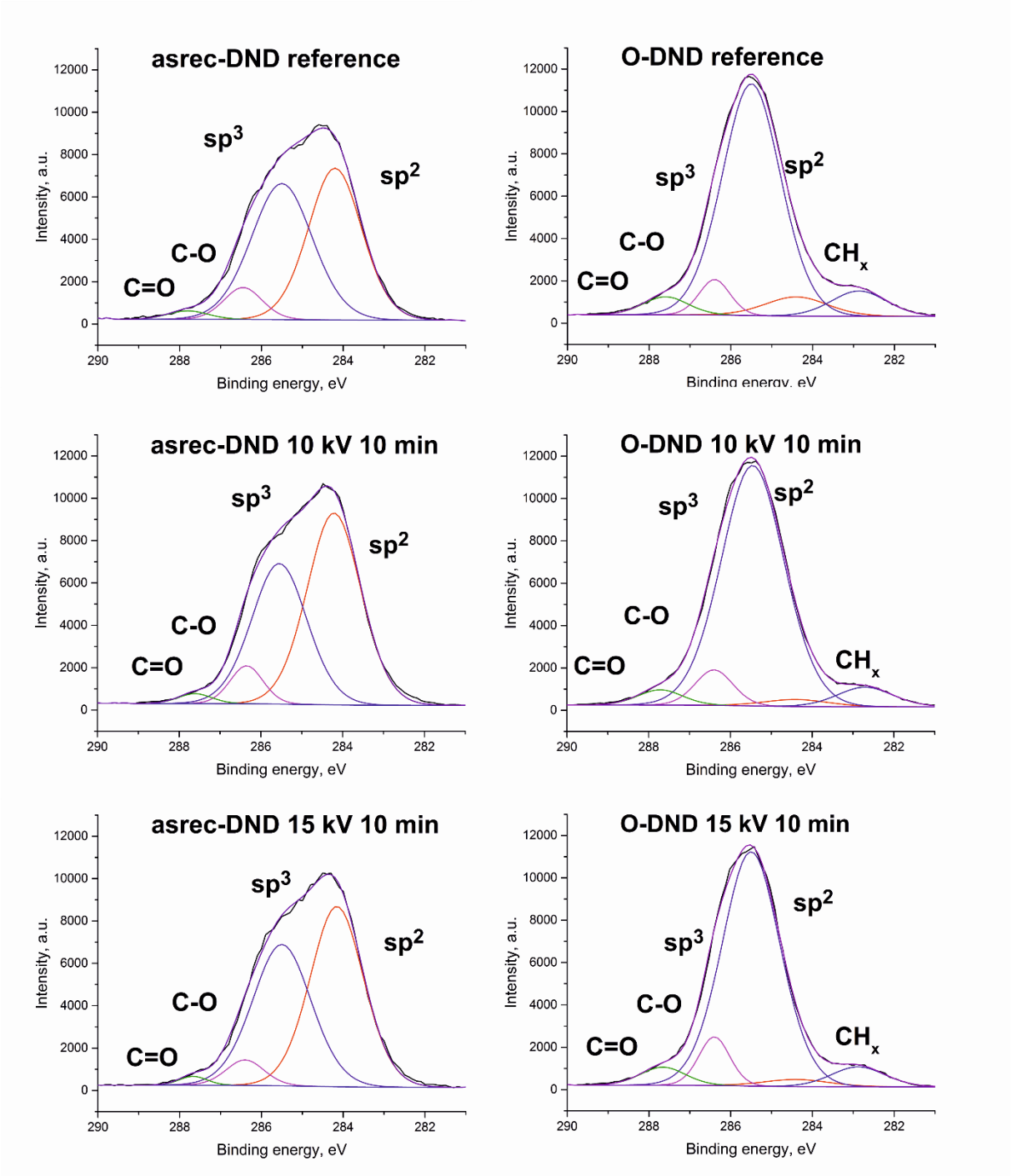


Fig. S3. Deconvoluted C 1s peak from XPS spectra.

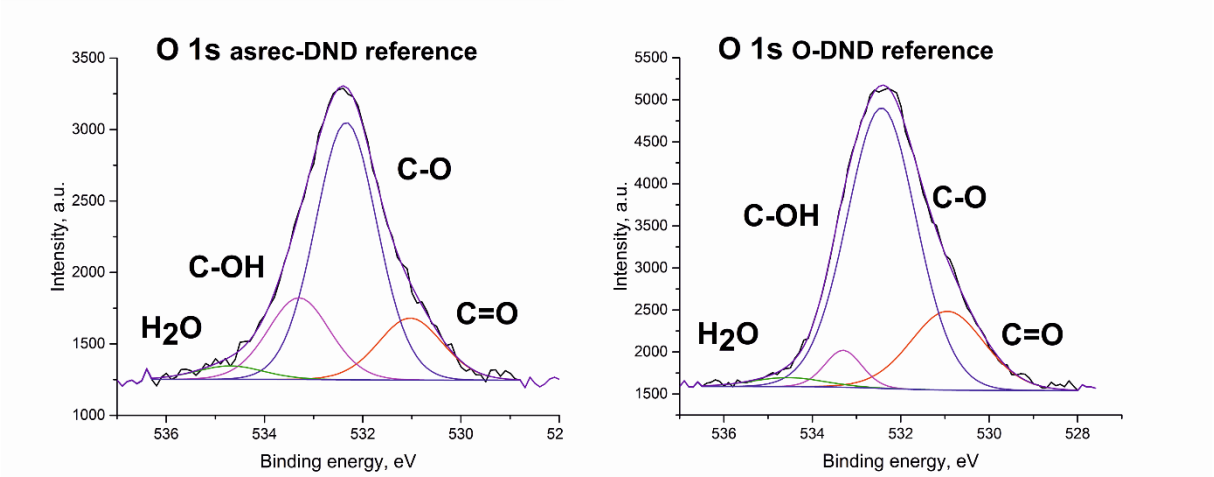
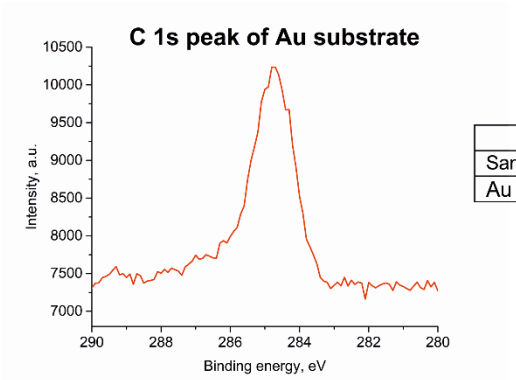


Fig. S4. The water contribution was estimated from deconvolution of O 1s peaks. The O 1s peaks were fitted into 4 peaks: 531.1 eV C=O, 532.3 eV C−O, 533.3 eV C−OH, and 534.7 eV O in H_2O.[1] The results of the O 1s fits show that the samples had maximally 2% of water and that as-received DNDs with hydrogen-related groups on the surface binds more water. The amount of water and difference between as-received and oxidized DNDs is in a good agreement with thermogravimetric analysis of DNDs in our prior work.[2]



	Relative concentration of atoms		
Sample	O.at.%	C.at.%	Au.at.%
Au substrate	**9**	**32**	**59**

Fig. S5. The high resolution C 1s spectrum and chemical composition from XPS analysis on bare Au substrate evidencing some contamination by carbon but no band at 282.7 eV specific to O-DND.

References

1 J. V. Rojas, M. Toro-Gonzalez, M. C. Molina-Higgins and C. E. Castano, *Mater. Sci. Eng. B*, 2016, **205**, 28–35.

2 S. Stehlik, T. Glatzel, V. Pichot, R. Pawlak, E. Meyer, D. Spitzer and B. Rezek, *Diam. Relat. Mater.*, 2016, **63**, 97–102.