Electronic Supplementary Material (ESI) for Nanoscale.

Multifunctional Electrospun Polymeric Nanofibrous Mat for Catalytic Reduction, Photocatalysis and Sensing

Osman Arslan,[a*] Tamer Uyar[a*]

[a] Institute of Materials Science & Nanotechnology, UNAM-National Nanotechnology Research Center, Bilkent University, 06800, Ankara, TURKEY

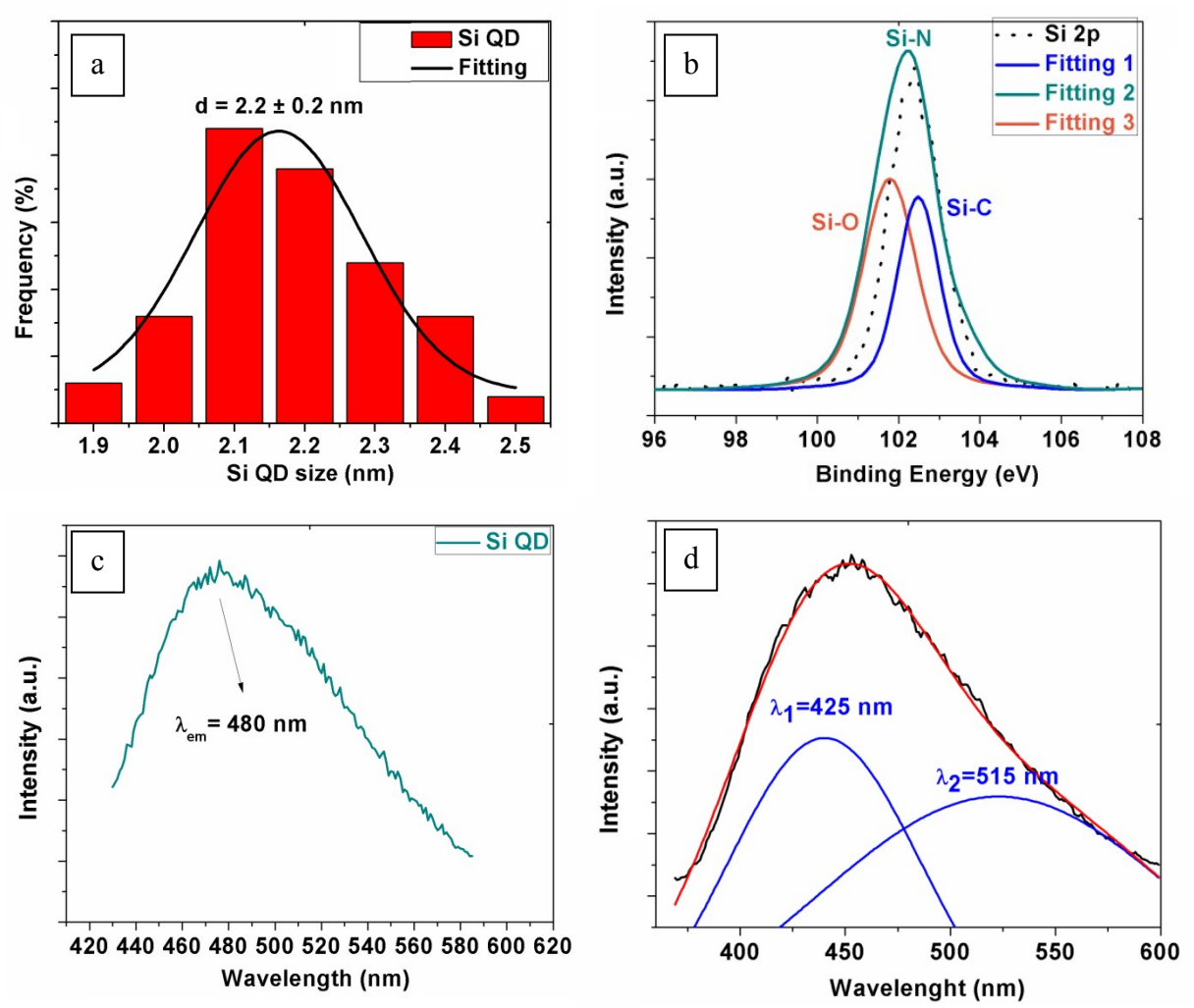


Figure S1: a) Average size distribution of the as prepared Si QDs b) High resolution XPS spectra with its deconvolution for the as prepared Si QDs c) PL spectra for the Si QDs d)Deconvoluted PL peak for the as prepared Si QD[1]

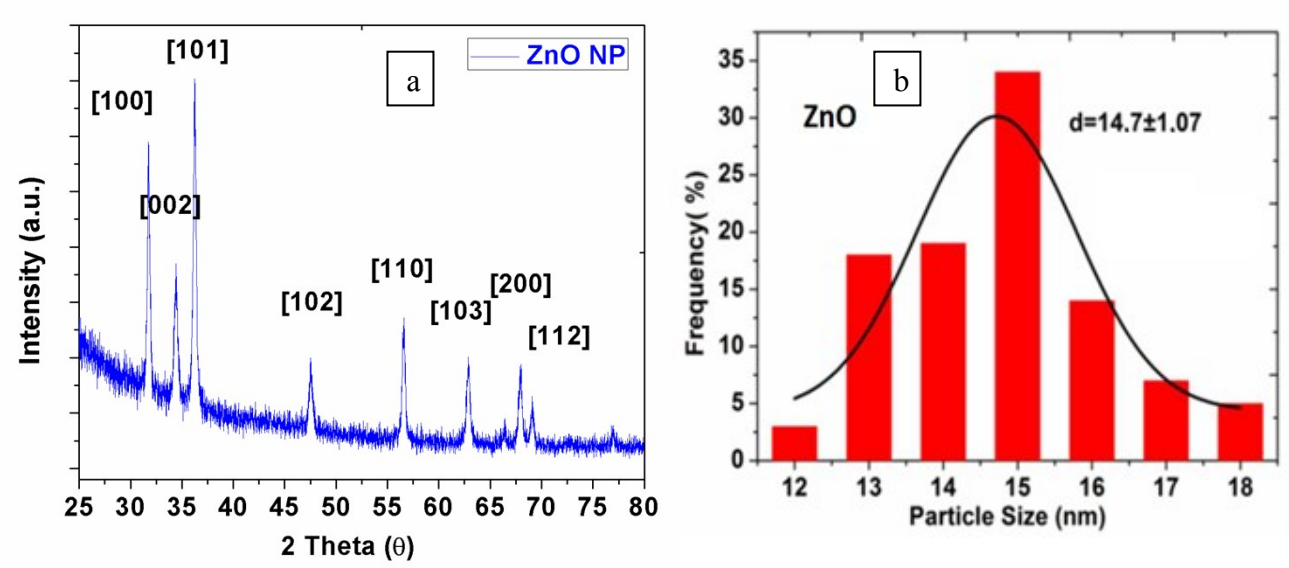


Figure S2: a) XRD pattern for the ZnO NP b) Average size distribution of the ZnO NP obtained from TEM

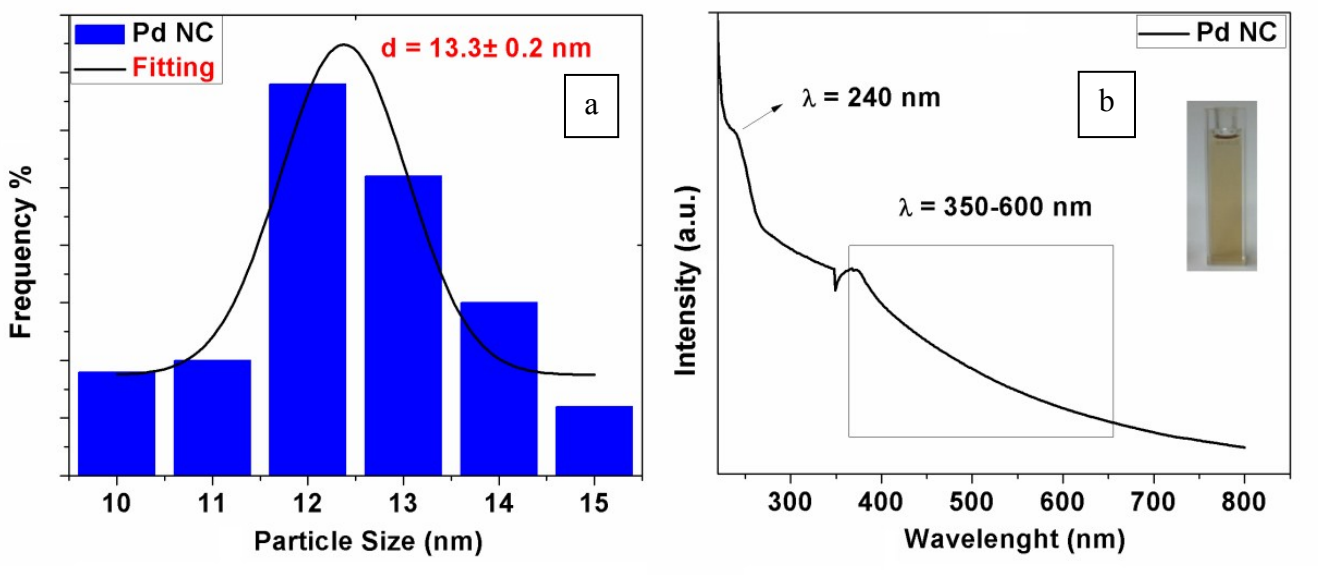


Figure S3: a) Average size distribution of the as-synthesized Pd nanocubes b) UV-Vis absorption spectra of the as synthesized Pd NC solution[2]

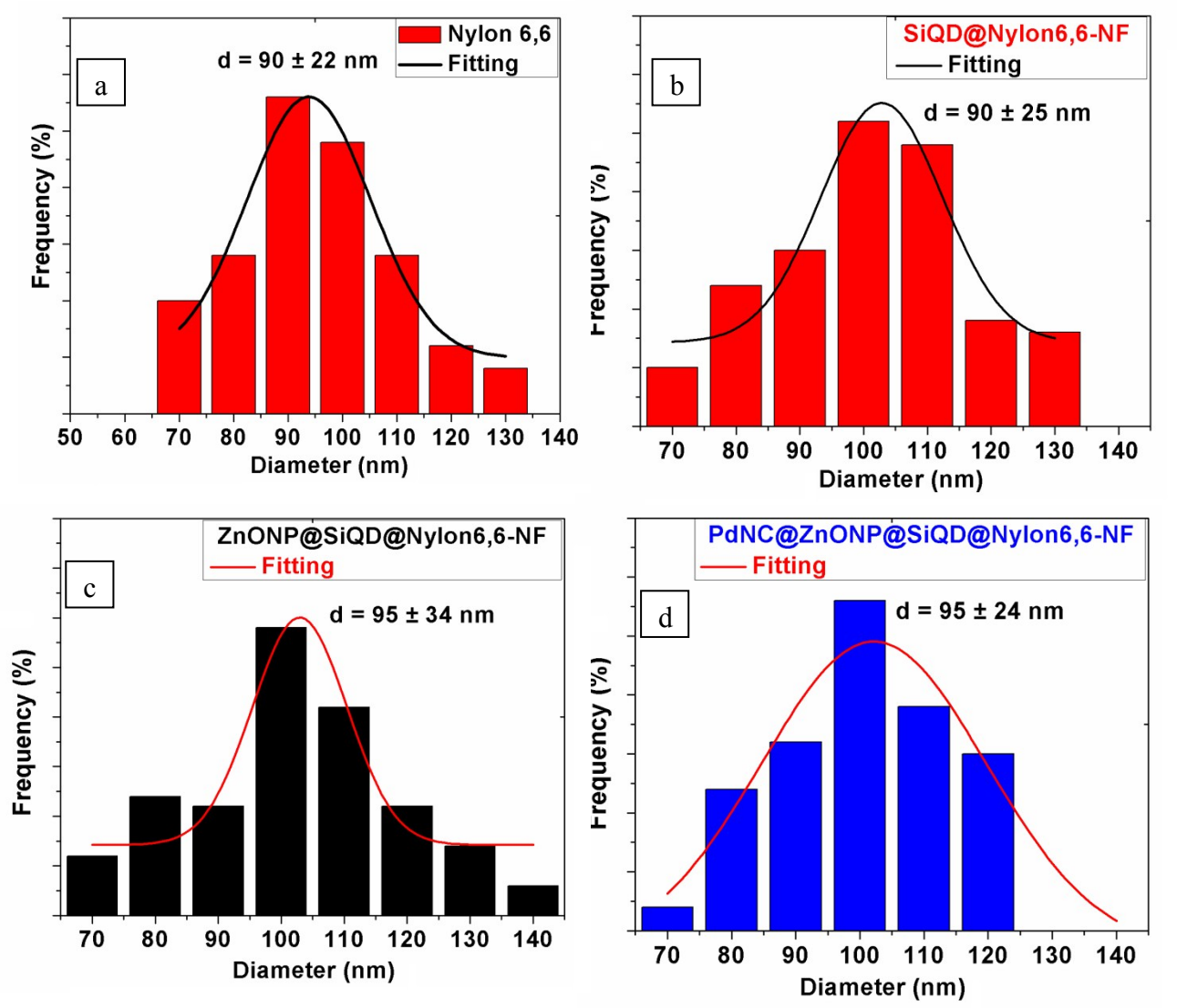
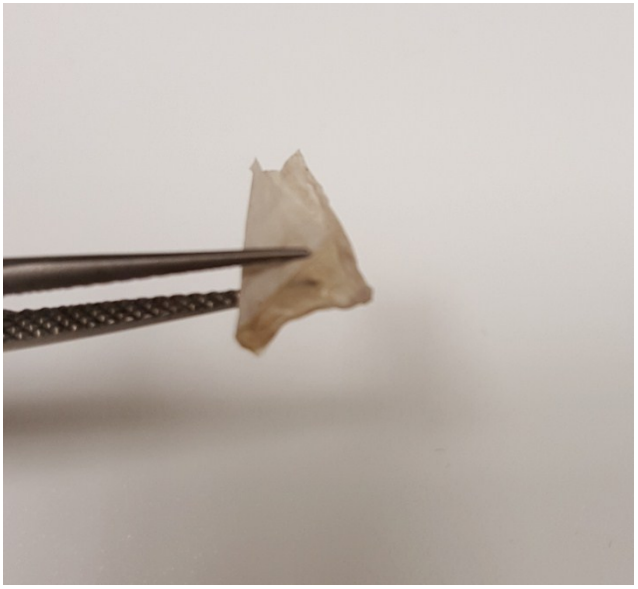


Figure S4: a) Average diameters for the Nylon 6,6-NF obtained from SEM b) Average diameters for the SiQD@Nylon 6,6-NF obtained from SEM c) Average diameters for the ZnONP@SiQD@Nylon 6,6-NF obtained from SEM d) Average diameters for the PdNC@ZnONP@SiQD@Nylon 6,6-NF obtained from SEM



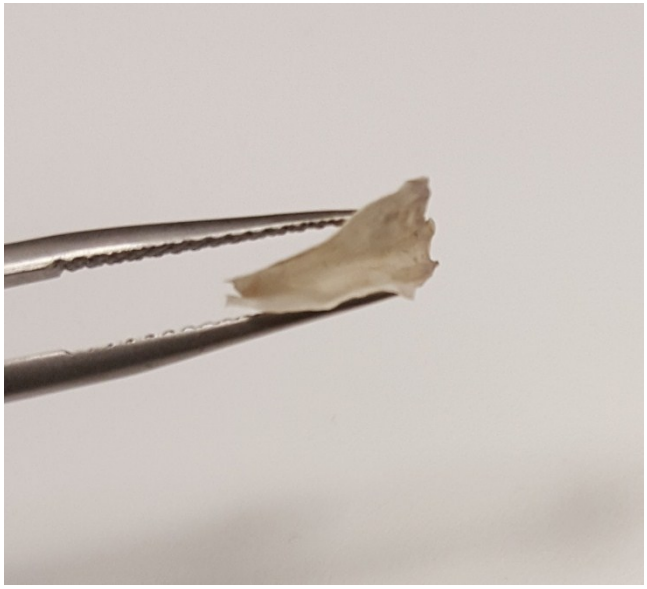


Figure S5: Visual observation of the flexibility for the PdNC@ZnONP@SiQD@Nylon 6,6-NF mat (see also Video S1).

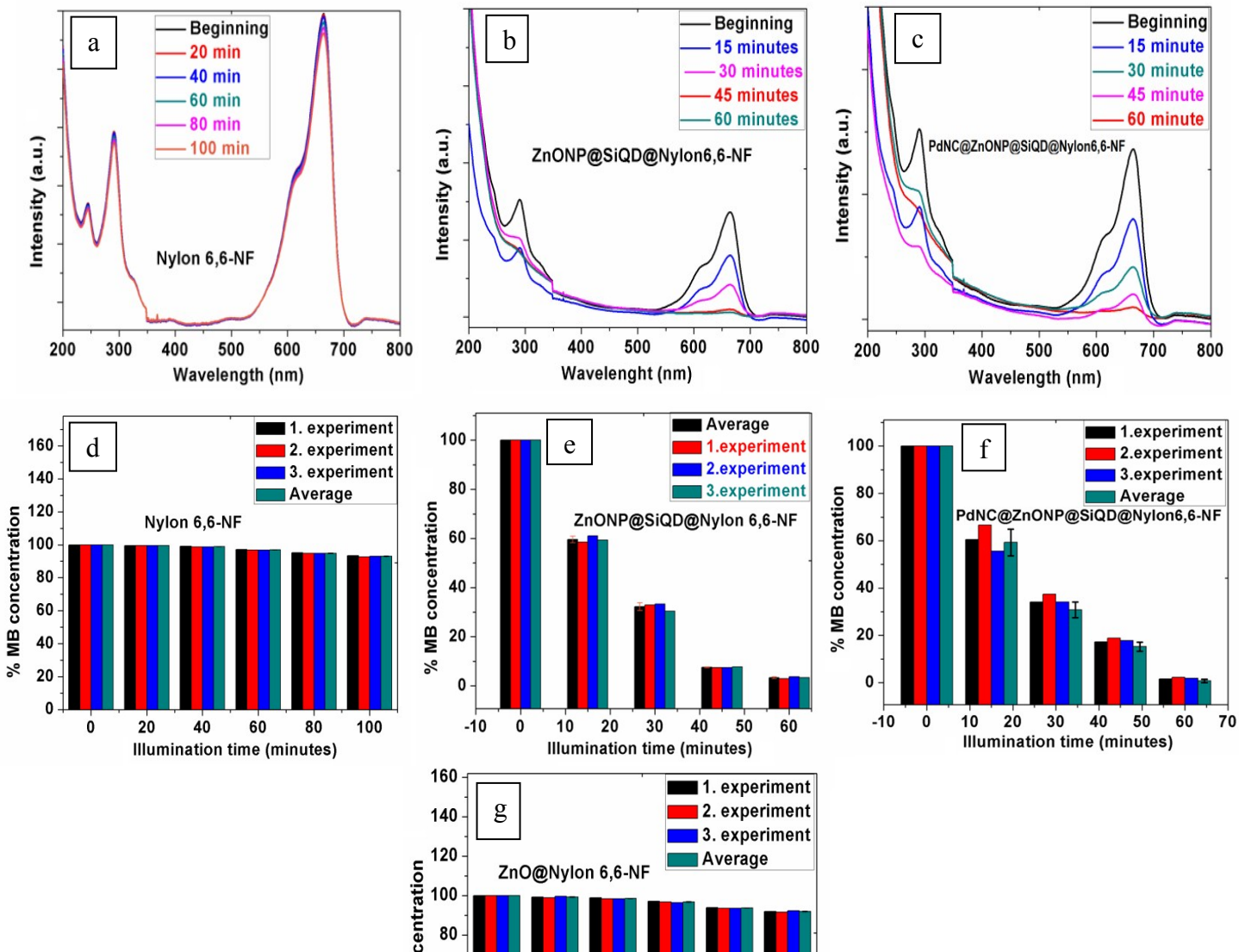


Figure S6: UV-Vis absorption spectra for the blank photocatalytic decomposition experiments of a)Nylon 6,6-NF b)ZnONP@SiQD@Nylon6,6-NF c)PdNC@ZnONP@SiQD@Nylon6,6-NF d) Repetitive photocatalysis experiments for Nylon 6,6-NF e) Repetitive photocatalysis experiments for ZnO@SiQD@Nylon 6,6-NF f) Repetitive photocatalysis experiments for PdNC@ZnO@SiQD@Nylon 6,6-NF g) Repetitive photocatalysis experiments for ZnO@Nylon 6,6-NF

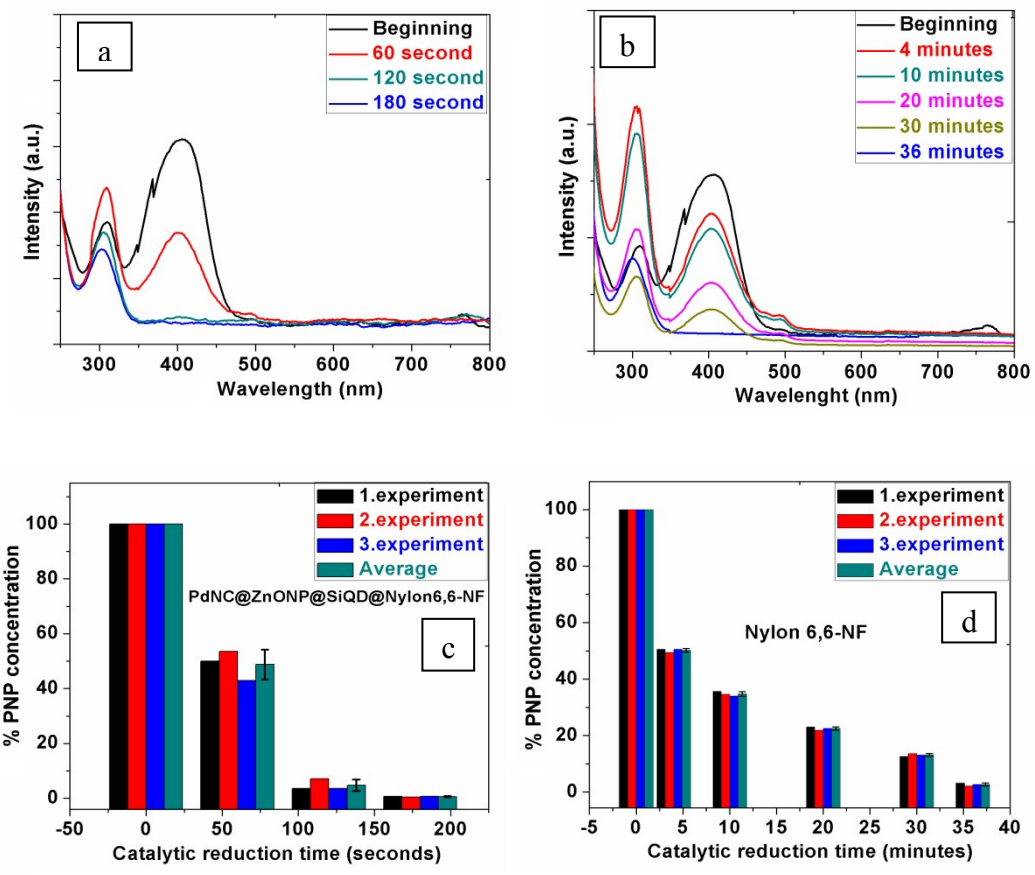
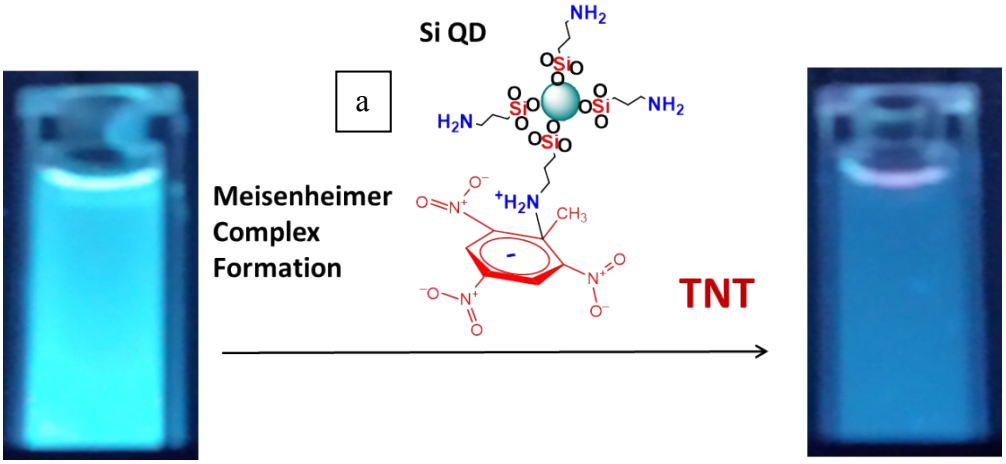


Figure S7: a) UV-Vis investigation of the catalytic PNP reduction by PdNC@ZnONP@SiQD@Nylon6,6-NF b) UV-Vis investigation of the catalytic PNP reduction by Nylon6,6-NF c) Repetitive catalytic reduction experiments for PdNC@ZnONP@SiQD@Nylon6,6-NF d) Repetitive catalytic reduction experiments for Nylon 6,6-NF e) Repetitive catalytic reduction experiments for PdNC@Nylon 6,6-NF



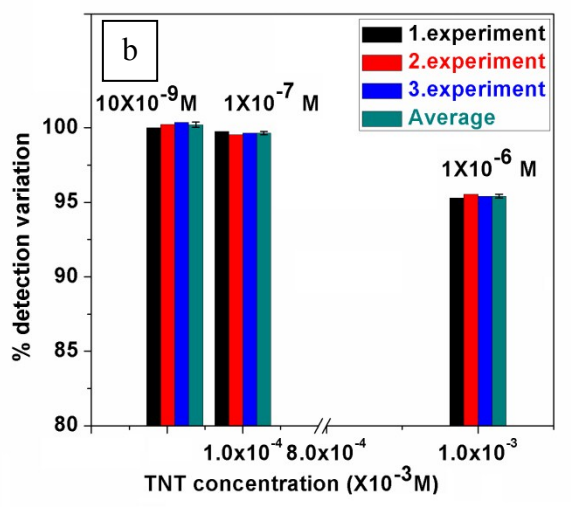


Figure S8: a) Representative image of the visual observation for the Si QD quenching by TNT[2] b) Repetitive quenching experiments for lowest 3 concentration of the TNT

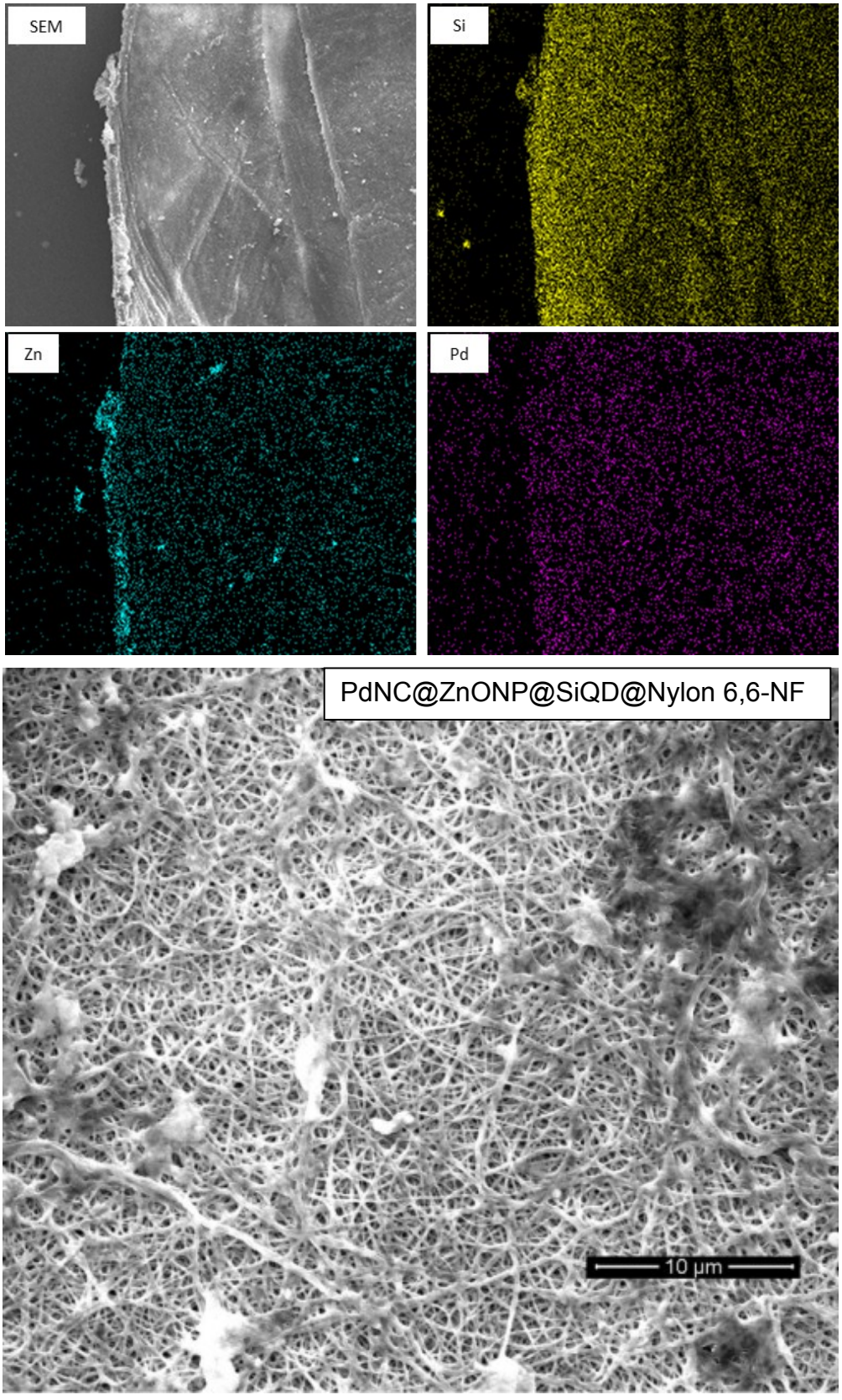


Figure S9:
EDX
atomic

mapping for certain (Zn, Pd, Si) atoms and representative SEM image for PdNC@ZnONP@SiQD@Nylon 6,6-NF after colorimetric TNT detection test.

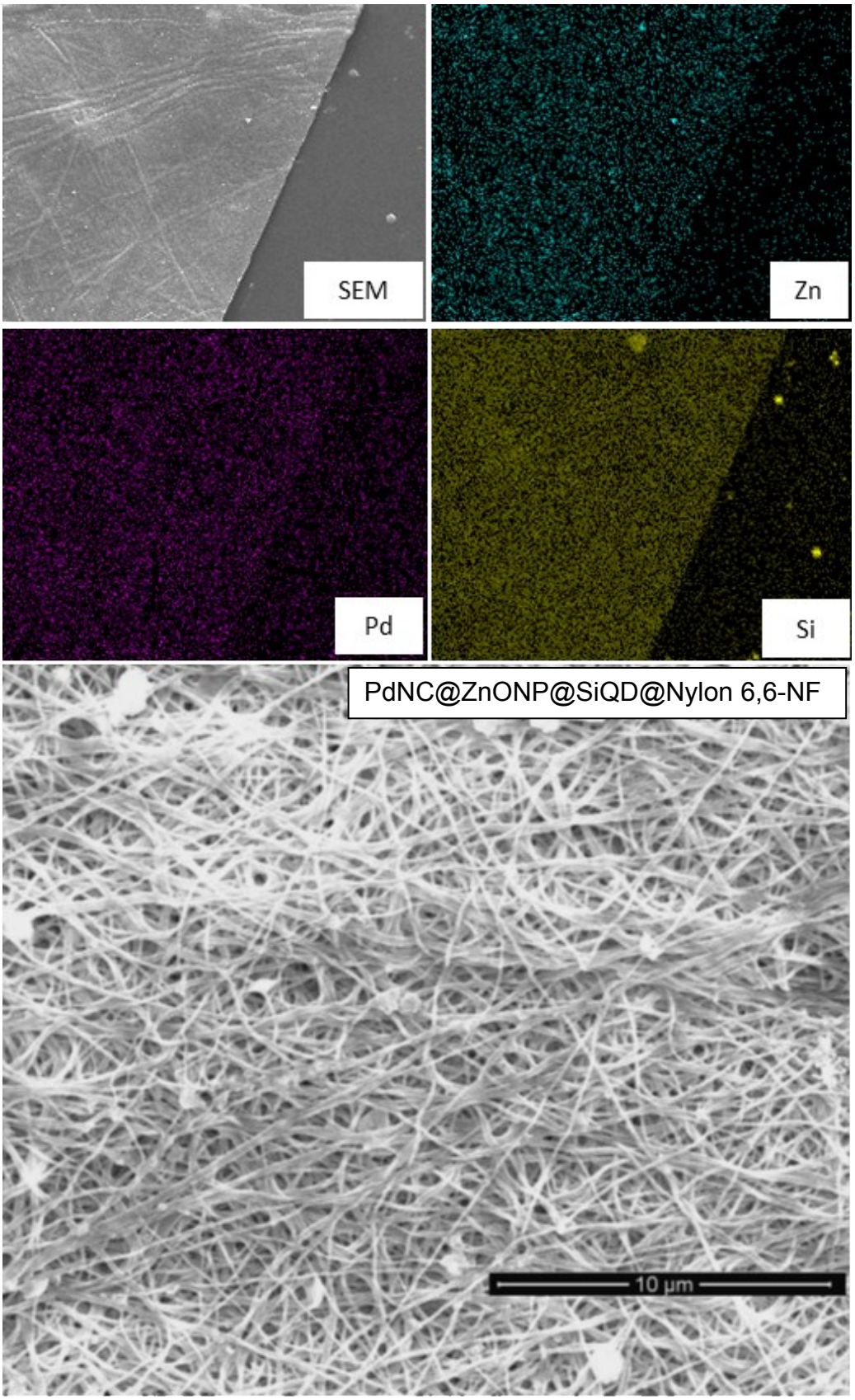


Figure S10 EDX atomic mapping for certain (Zn, Pd, Si) atoms and representative SEM image for PdNC@ZnONP@SiQD@Nylon 6,6-NF after photocatalytic MB decomposition.

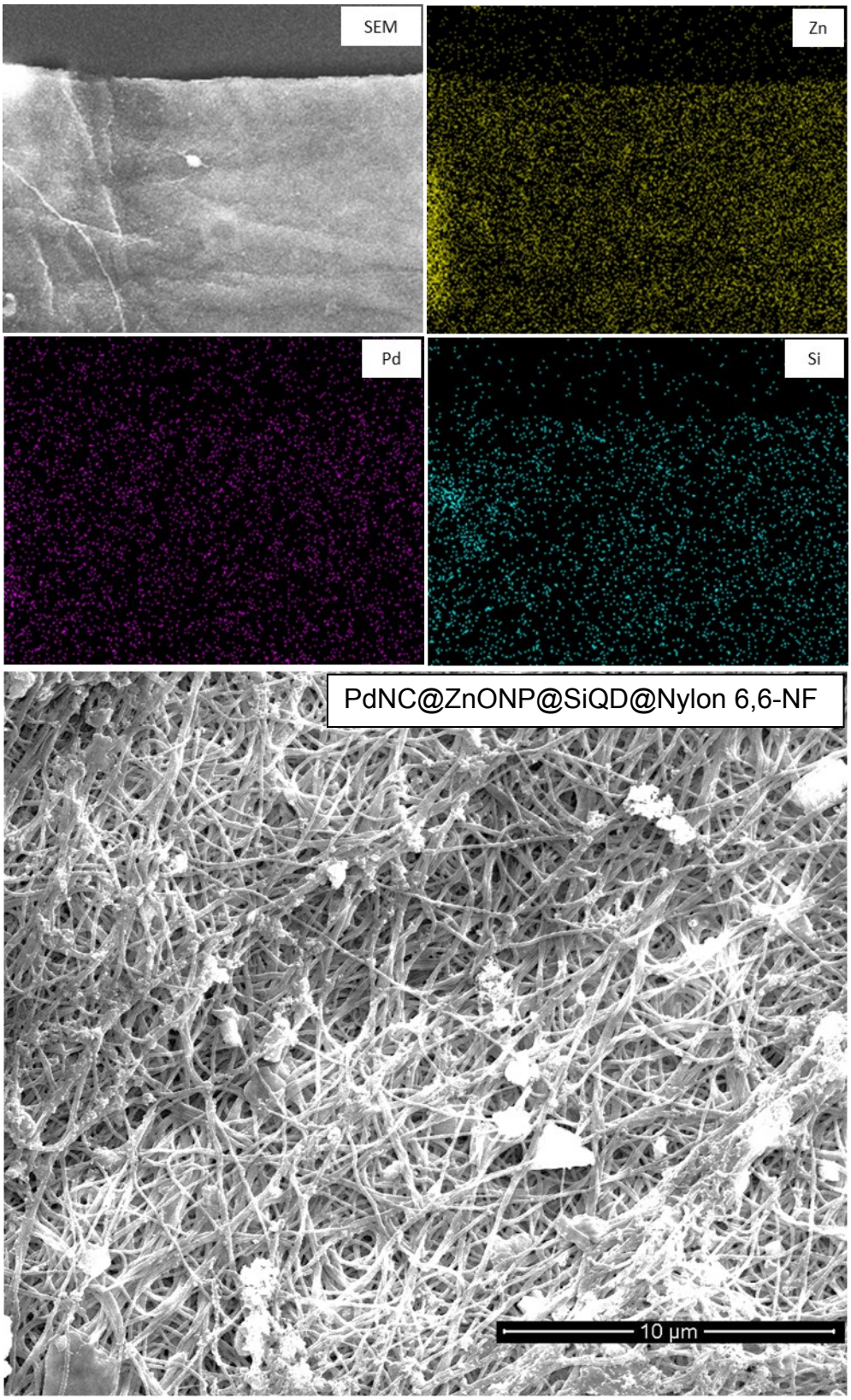


Figure S11 EDX atomic mapping for certain (Zn, Pd, Si) atoms and representative SEM image for PdNC@ZnONP@SiQD@Nylon 6,6-NF after PNP reduction.

Table 1 Quantitative detection of the each atom in the presented nanofibrous mats for the obtained by EDX and XPS measurements

	C%	O %	N%	Si %	Pd%	Zn%
XPS						
Nylon 6,6-NF	75	12	13	---	---	---
ZnONP@Nylon 6,6-NF	74.6	12.8	12.4	---	---	0.4
PdNC@Nylon 6,6-NF	75.2	12.6	12.1	---	0.08	---
Pd@ZnO@ZnONP@Nylon 6,6-NF	60.2	17.3	2.0	10.1	1.3	7.2
EDX						
Nylon 6,6-NF	79	10	11	---	---	---
ZnONP@Nylon 6,6-NF	78.6	11.4	9.9	---	---	0.1
PdNC@Nylon 6,6-NF	75.2	12.6	12.1	---	<0.1	---
Pd@ZnO@ZnONP@Nylon 6,6-NF	50.1	15.7	8.3	11.2	1.5	8.6

References

1- O. Arslan, Z. Aytac, T. Uyar, J.of Mat. Chem. C, 2017,5, 1816-1825.
2- O.Arslan, F.Topuz, H.Erdem,Necmi Biyikli, T. Uyar, New J. Chem.,2017, 41, 4145-4156