Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Novel Pd based catalyst for the removal of organic and emerging contaminants

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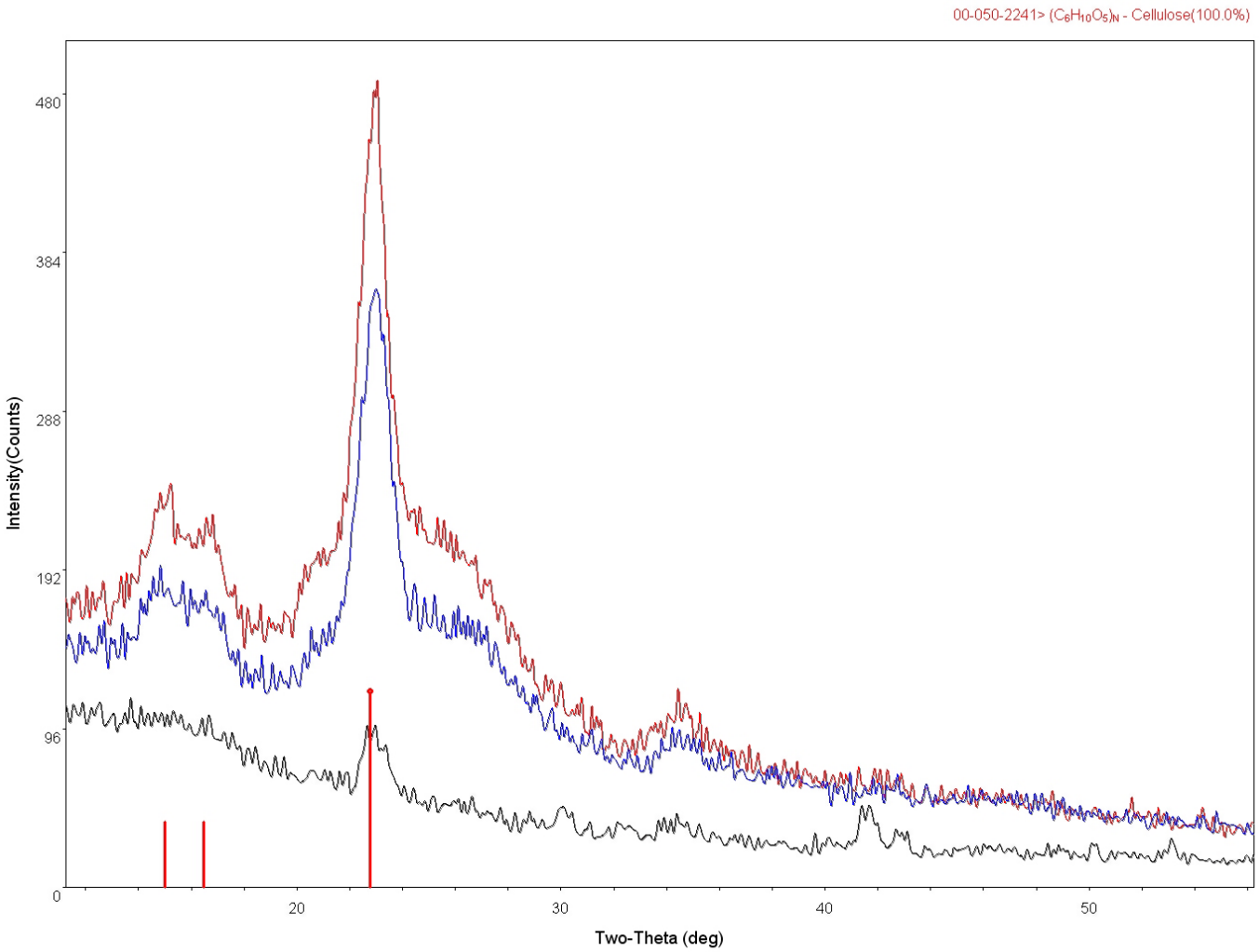

Figure S1. The XRD pattern of control cellulose sample, coated with Polypyrrole. Red line- 2.882 M, blue line-1.441 M, and black line-0.2882 M of pyrrole used for the reaction.

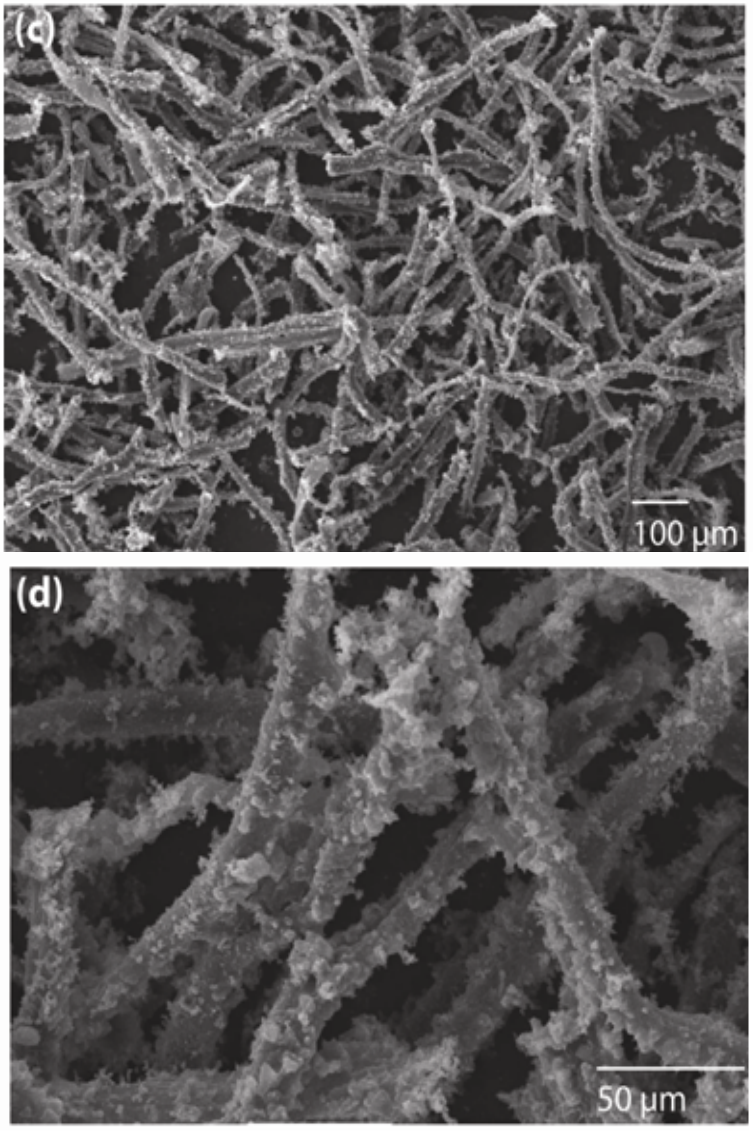

Figure S2. The decoration of (a-b) Au nanoparticles on polypyrrole coated cellulose fibers, prepared using low concentration of pyrrole(0.2882 M)

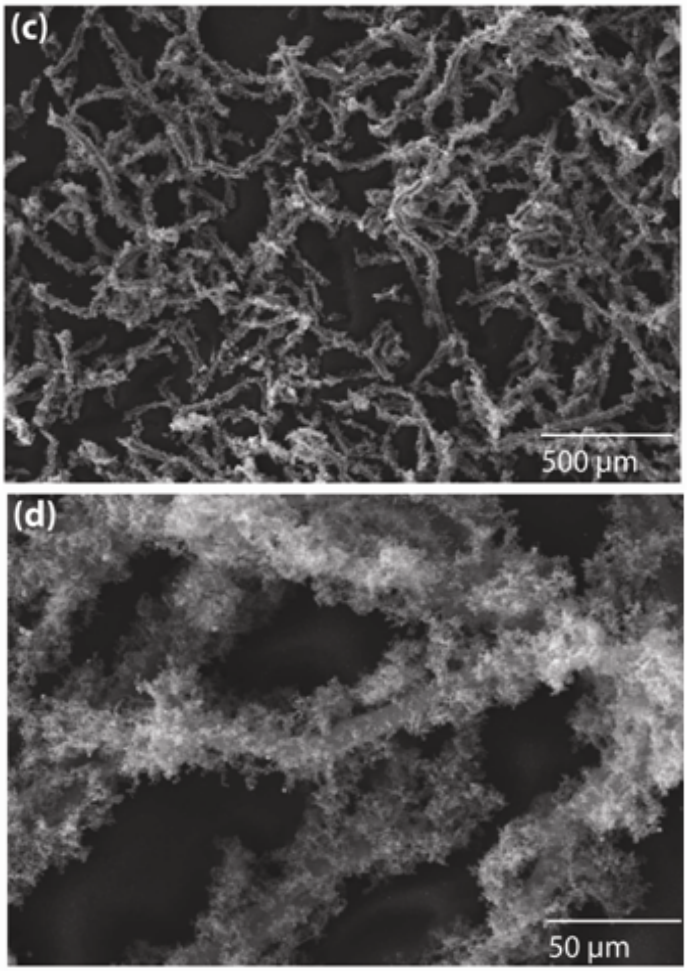

Figure S3. The decorationof (a-b) Au nanoparticles on polypyrrole-coated cellulose fibers, prepared using a medium concentration of pyrrole (1.441 M).

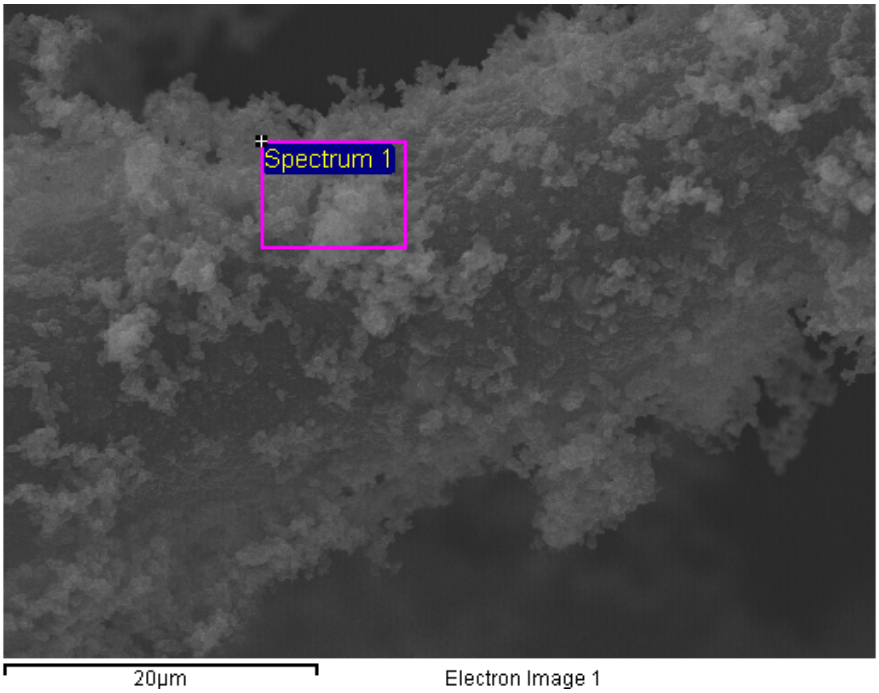

Figure S4. SEM image of self-assembled Pd nanoparticles on cellulose nanofibers, prepared using a medium concentration of pyrrole (5 mL).

Element	Weight%	Atomic%
C K	51.59	67.62
N K	10.61	11.92
O K	13.15	12.93
Na K	2.40	1.64
S K	0.23	0.11
Cl K	8.87	3.94
Cu K	0.16	0.04
Pd L	11.10	1.64
Au L	1.89	0.15
Totals	100.00	

Table S1. EDS analysis of self-assembled Pd nanoparticles on cellulose nanofibers, prepared using a mediumconcentration of pyrrole (5 mL).

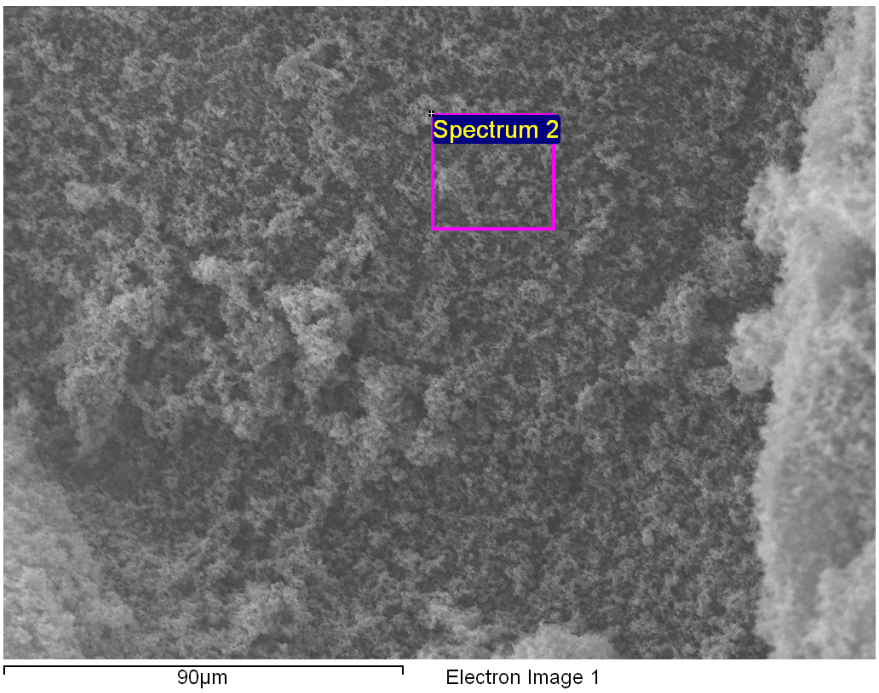

Figure S5. SEM image of self-assembled Pt nanoparticles on cellulose nanofibers, prepared using a high concentration of pyrrole (10 mL).

Element	Weight%	Atomic%	Compd%	Formula
Cl K	51.07	70.41	0.00	
Cu K	0.79	0.61	0.99	CuO
Pt L	17.28	4.33	20.12	PtO2
Au L	24.80	6.15	27.82	Au2O3
O	6.06	18.50		
Totals	100.00			

Table S2. EDS analysis of self-assembled Pt nanoparticles on cellulose nanofibers, prepared using a high concentration of pyrrole (10 mL).

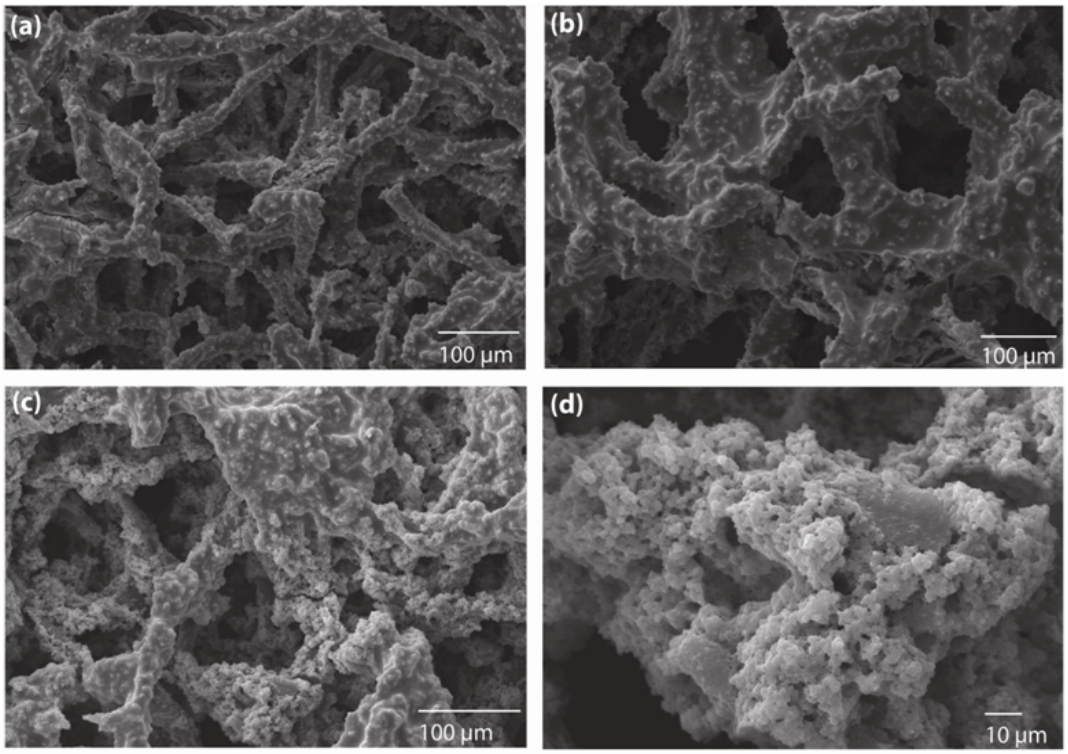

Figure S6. The decorationof Fe nanostrctures on cellulose nanofibers, prepared using (a) 0.2882 M, (b) 1.441 M, and (c-d) 2.882 M of pyrrole.

Element	Weight%	Atomic%	Compd%	Formula
Al K	0.33	0.44	0.62	Al2O3
Cl K	16.01	16.28	0.00	
Fe K	54.14	34.94	73.53	Fe2O3
Au L	8.78	1.61	9.85	Au2O3
O	20.75	46.74		
Totals	100.00			

Table S3. EDS analysis of self-assembled Fe nanoparticles on cellulose nanofibers, prepared using a high concentration of pyrrole (10 mL).

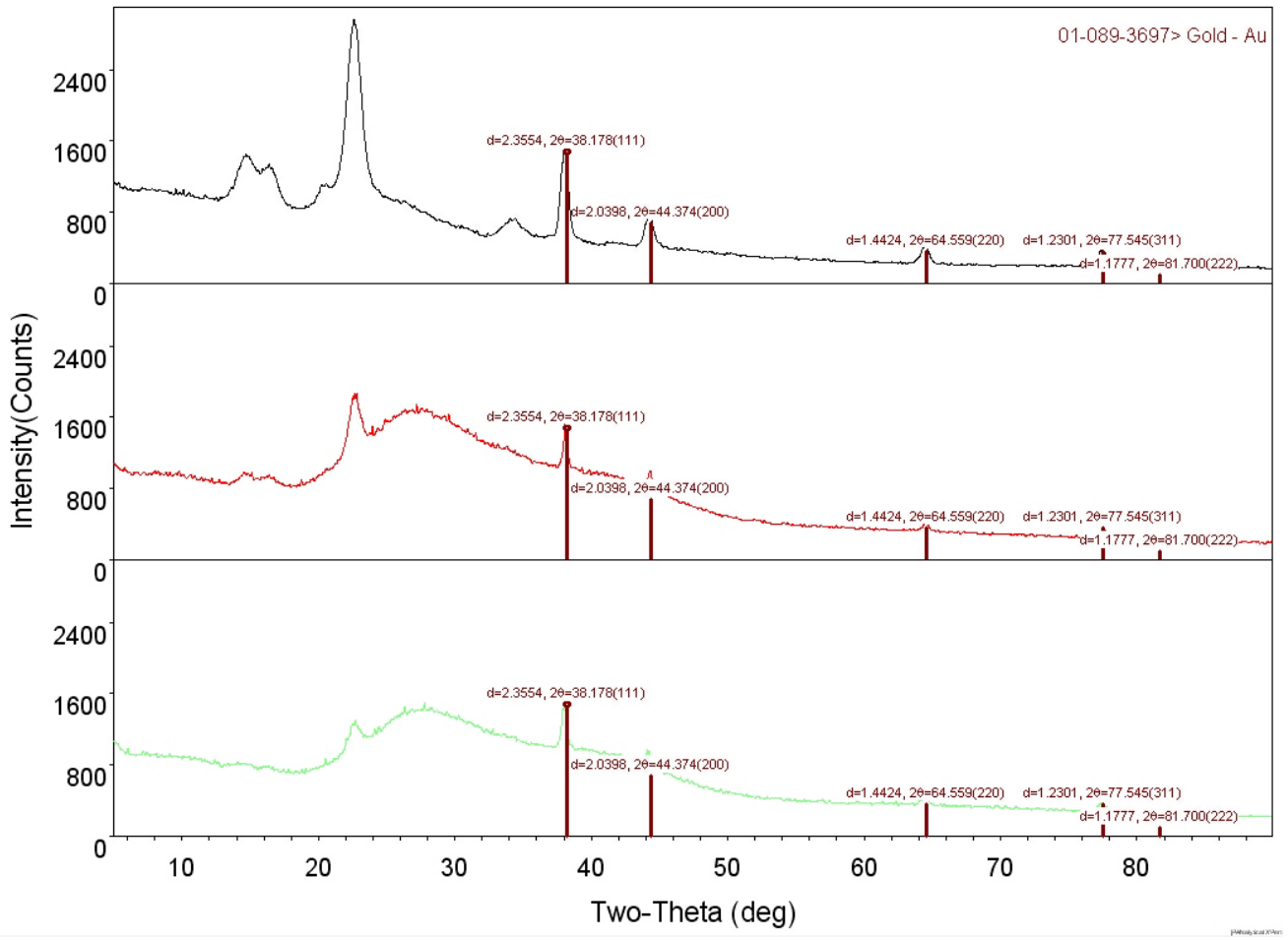

Figure S7. XRD pattern of Au nanostructures on polypyrrole-coated cellulose fibers prepared using (a) 0.2882 M, (b) 5, and (c) 2.882 M of pyrrole.

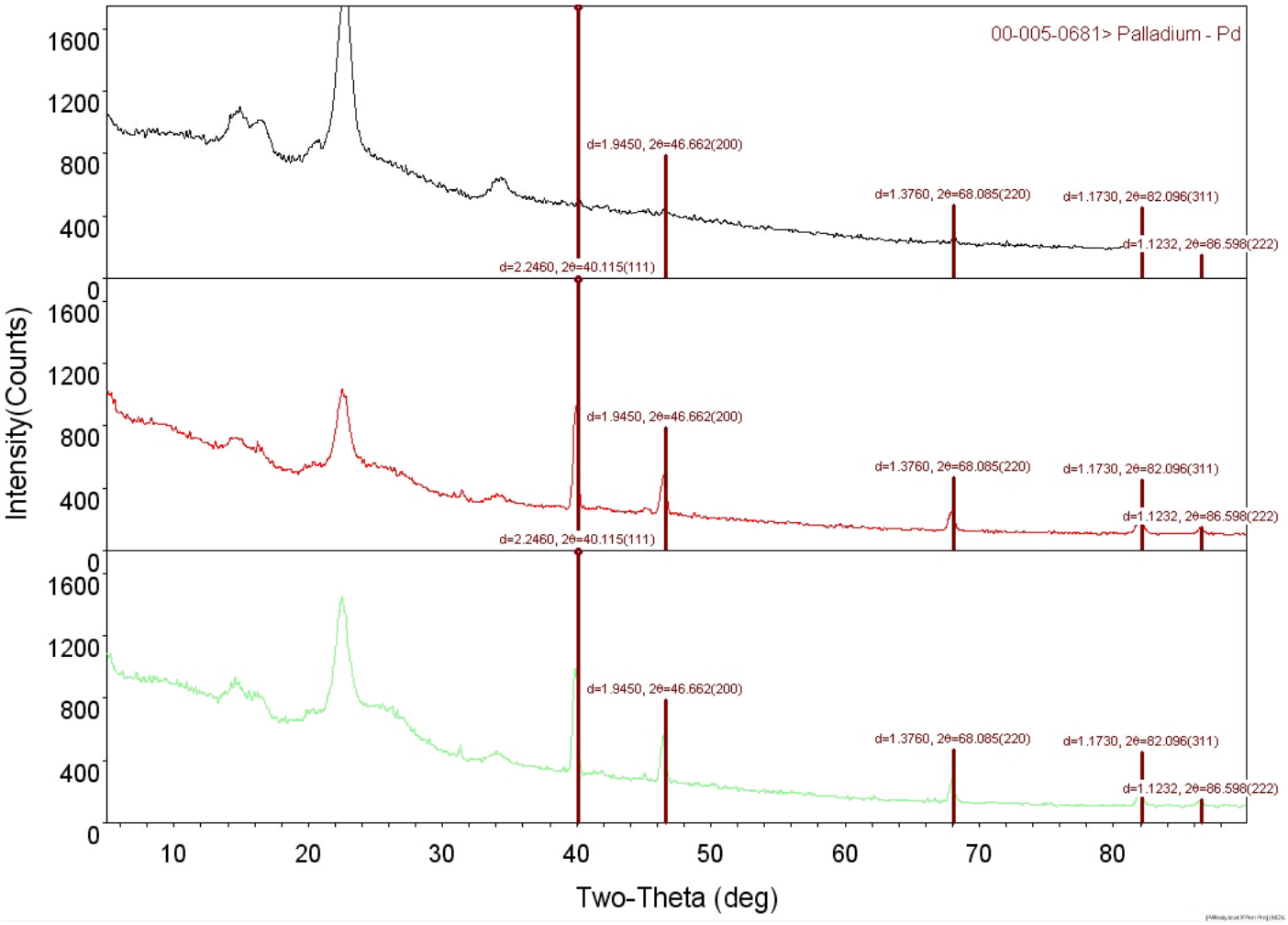

Figure S8. XRD patterns of Pd nanostructures on polypyrrole-coated cellulose fibers prepared using (a) 0.2882 M, (b) 1.441 M, and (c) 2.882 M of pyrrole.

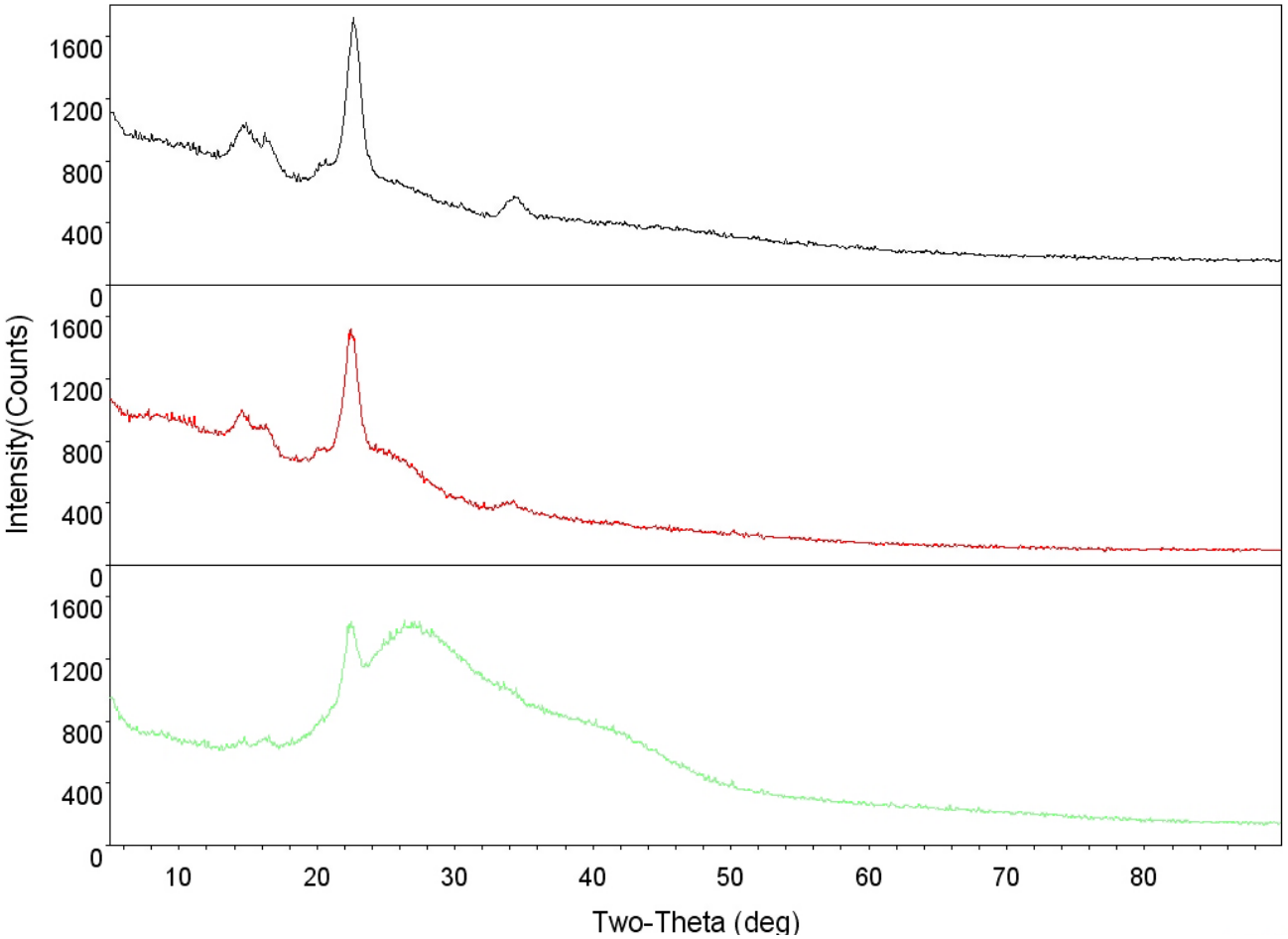

Figure S9. XRD pattern of Pt nanostructures on polypyrrole-coated cellulose fibers prepared using (a) 0.2882 M, (b) 5, and (c) 2.882 M of pyrrole.

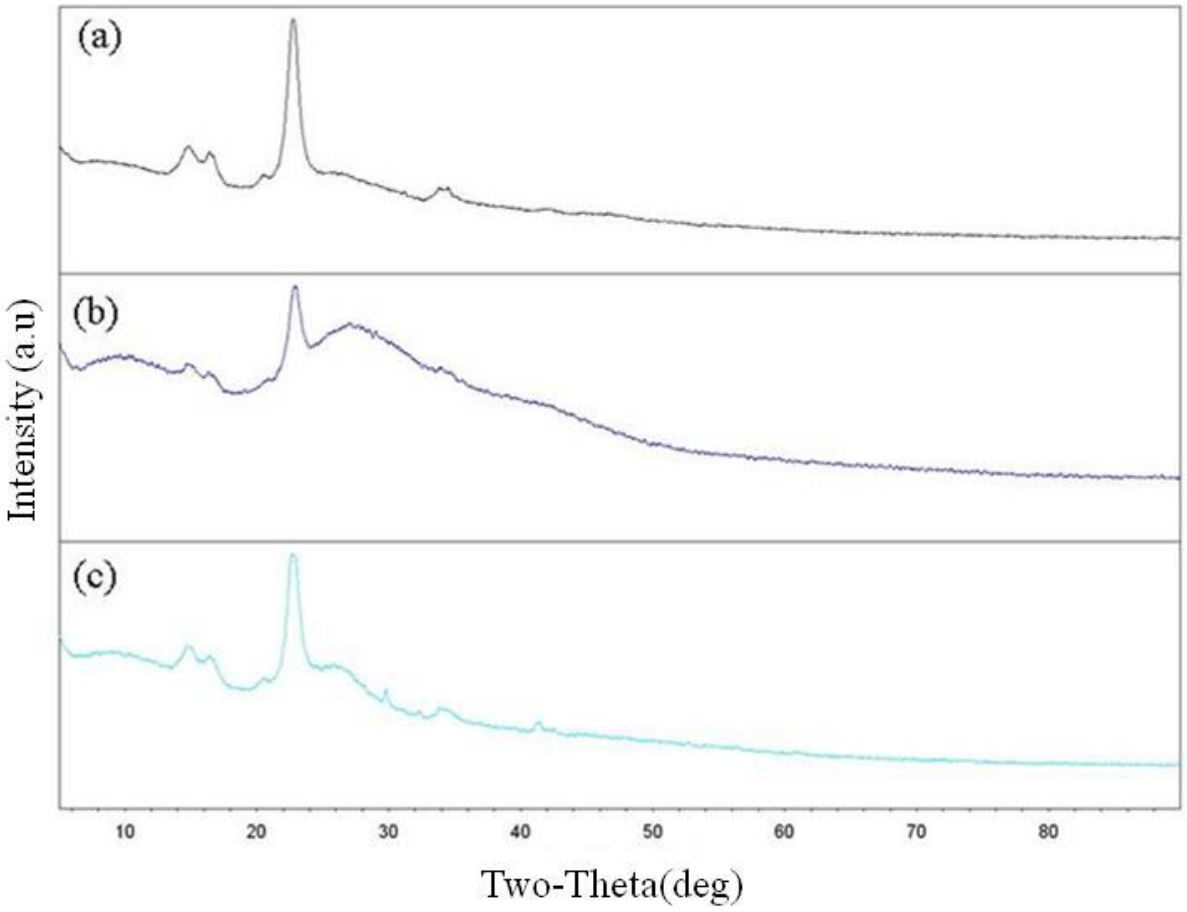

Figure S10. XRD patterns of iron nanoparticles formed on polypyrrole-coated cellulose fibers

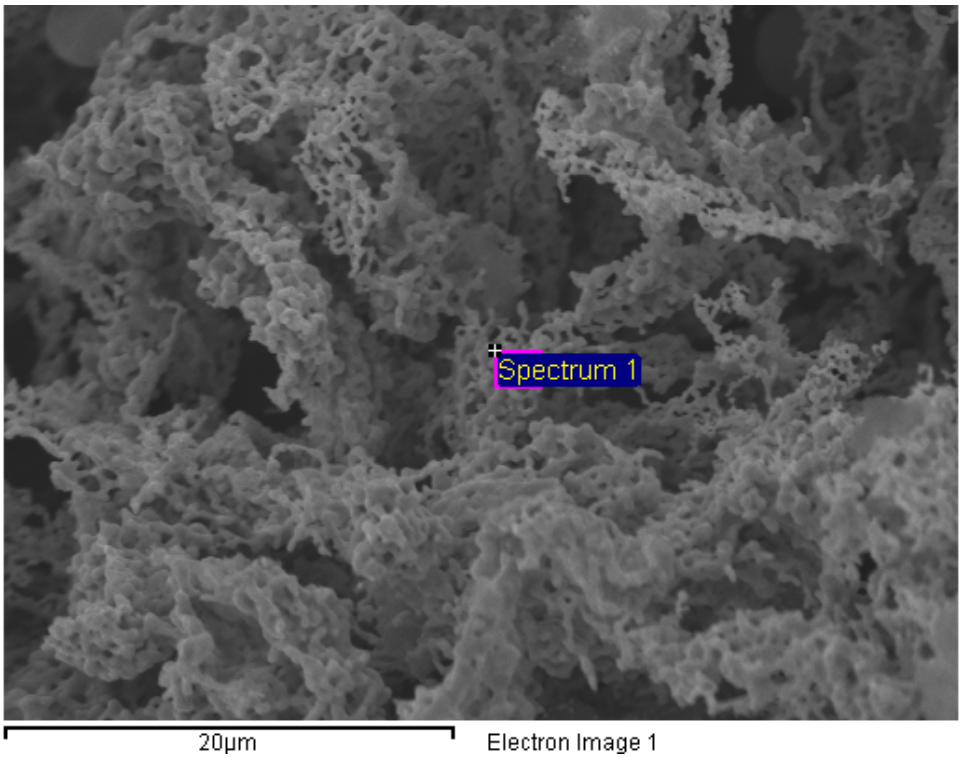

Figure S11. SEM image of autocatalytic reduced Pd on 5 ml polypyrrole coated after cellulose fibers after microwave ignition for 1 minute.

Table S4. BET surface area of microwave ignited pre-selected morphology PdO_2

Single point surface area at P/Po = 0.299210665:	59.6067 m^2/g
BET Surface Area:	60.6141 m^2/g
Langmuir Surface Area:	101.3300 m^2/g
t-Plot Micropore Area:	4.5622 m^2/g
t-Plot External Surface Area:	56.0518 m^2/g
BJH Adsorption cumulative surface area of pores between 17.000 Å and 3000.000 Å diameter:	52.0934 m^2/g
BJH Desorption cumulative surface area of pores between 17.000 Å and 3000.000 Å diameter:	64.8865 m^2/g
Single point adsorption total pore volume of pores less than 2330.929 Å diameter at P/Po = 0.991644095:	0.112058 cm^3/g
t-Plot micropore volume:	0.002351 cm^3/g
BJH Adsorption cumulative volume of pores between 17.000 Å and 3000.000 Å diameter:	0.107117 cm^3/g
BJH Desorption cumulative volume of pores between 17.000 Å and 3000.000 Å diameter:	0.108777 cm^3/g
Adsorption average pore width (4V/A by BET):	73.9483 Å
BJH Adsorption average pore diameter (4V/A):	82.250 Å
BJH Desorption average pore diameter (4V/A):	67.057 Å