

Supplementary information.

## One-pot green bio-assisted synthesis of highly active catalytic Palladium nanoparticles in Porcine Gastric Mucin for environmental applications

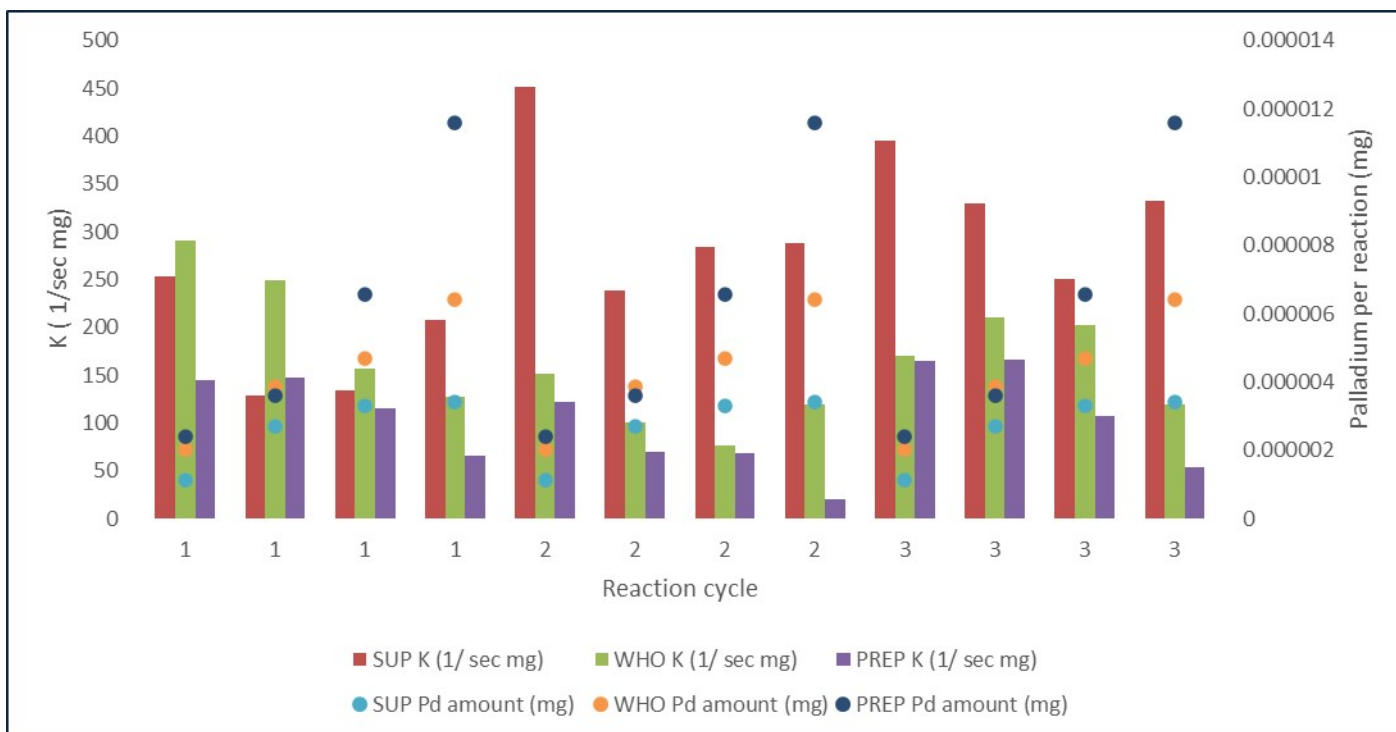
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PdNp SUP	reaction rate (1/sec)	reaction rate (1/min)
4	0.0027	0.162
6	0.011	0.66
8	0.0186	1.116
10	0.0187	1.122

PdNp WHO	reaction rate (1/sec)	reaction rate (1/min)
4	0.0017	0.0102
6	0.0058	0.348
8	0.0065	0.39
10	0.0175	1.05

PdNp PREP	reaction rate (1/sec)	reaction rate (1/min)
4	0.0025	0.15
6	0.0113	0.678
8	0.0102	0.612
10	0.0144	0.864

Table 1 Kinetic rates of nitrophenol reaction with PdNp synthesized with PGM from three different fractions of particles produced from four different initial amounts of Pd precursor.



Cycle	PdCl2 (mg)	reaction rate (1/min)	reaction rate (1/s)
1	4	0.0208	0.000346667
1	6	0.0318	0.00053
1	8	0.0453	0.000755
1	10	0.0454	0.000756667
2	4	0.0175	0.000291667
2	6	0.015	0.00025
2	8	0.0272	0.000453333
2	10	0.0141	0.000235
3	4	0.0237	0.000395
3	6	0.0359	0.000598333
3	8	0.0421	0.000701667
3	10	0.0369	0.000615

Figure S1 Kinetic rates of PdNp encapsulated in hydrogels from three different fractions and different PdNp weights per hydrogel pellet in three cycles of nitrophenol reduction.

SUP		WHO		PREP		
4mg		4mg		4mg		
	Time (min)	Yield %	Time (min)	Yield %	Time (min)	Yield %
	60	20	60	26.66667	60	48
	120	58.66667	120	94.66667	120	93.73333
	180	84.4	180	95.6	180	98.26667
	240	81.73333	240	96.4	240	99.6
	300	100.1333	300	100.4	300	101.3333
6mg		6mg		6mg		
	Time (min)	Yield %	Time (min)	Yield %	Time (min)	Yield %
	15	84	15	90.66667	15	90.66667
	20	78.66667	20	97.33333	20	94.66667
	30	88	30	92	30	94.66667
	40	92	40	94.66667	40	100
	60	97.33333	60	92	60	100
8mg		8mg		8mg		
	Time (min)	Yield %	Time (min)	Yield %	Time (min)	Yield %
	15	84	15	81.33333	15	84
	20	89.33333	20	96	20	85.33333
	30	90.66667	30	85.33333	30	94.66667
	40	90.66667	40	86.66667	40	94.66667
	60	94.66667	60	96	60	97.33333
10mg		10mg		10mg		
	Time (min)	Yield %	Time (min)	Yield %	Time (min)	Yield %
	15	84	15	86.66667	15	90.66667
	20	96	20	88	20	92
	30	93.33333	30	90.66667	30	86.66667
	40	94.66667	40	96	40	89.33333
	60	97.33333	60	98.66667	60	97.33333

Table 2 Reaction times and bi phenyl product yield produced from Suzuki-Miyaura reaction catalyzed by PdNp from three different fractions synthesized from different amounts of initial PdCl<sub>2</sub> precursor.

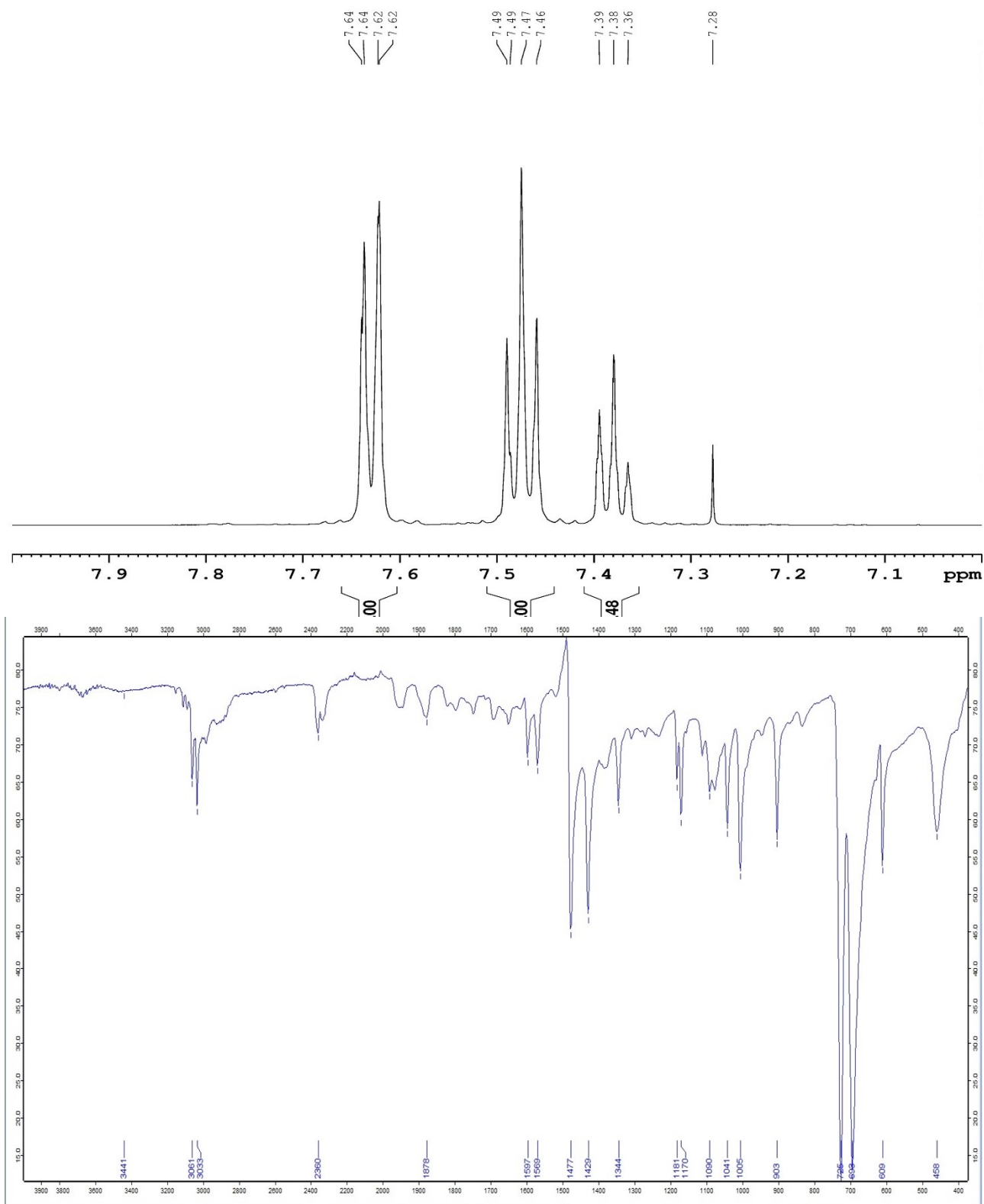


Figure S2 H-NMR (top) and FTIR (bottom) spectra of produced bi phenyl product produced by Suzuki-Miyaura reaction catalyzed by SUP PdNp fraction of PdNp synthesized from 6mg of initial PdCl<sub>2</sub> precursor.



Figure S3 optical image of produced PdNP fractions, B. optical image of hydrated(left) and dehydrated(right) PdNP hydrogel pellet catalyst.

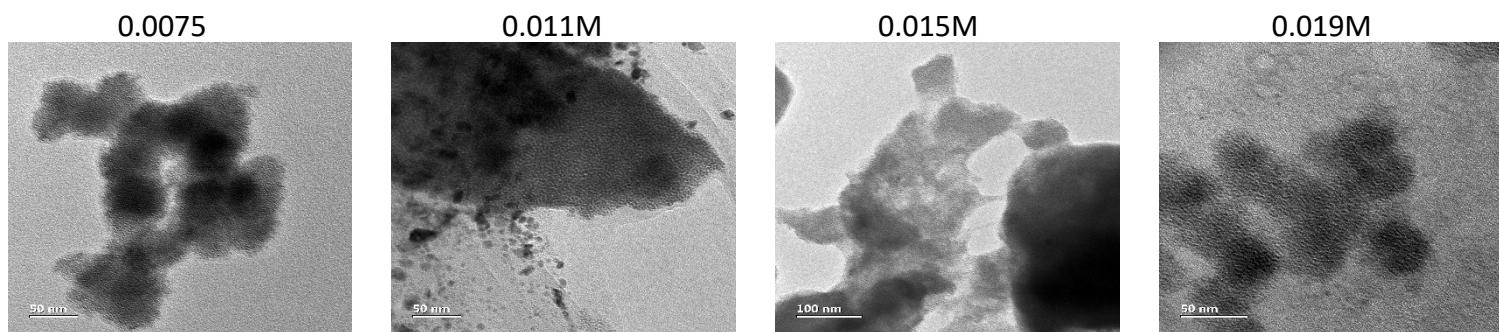


Figure S4 PdNP aggregated in large clusters collected from PREP fraction obtained from different initial concentration of PdCl<sub>2</sub> ionic salt

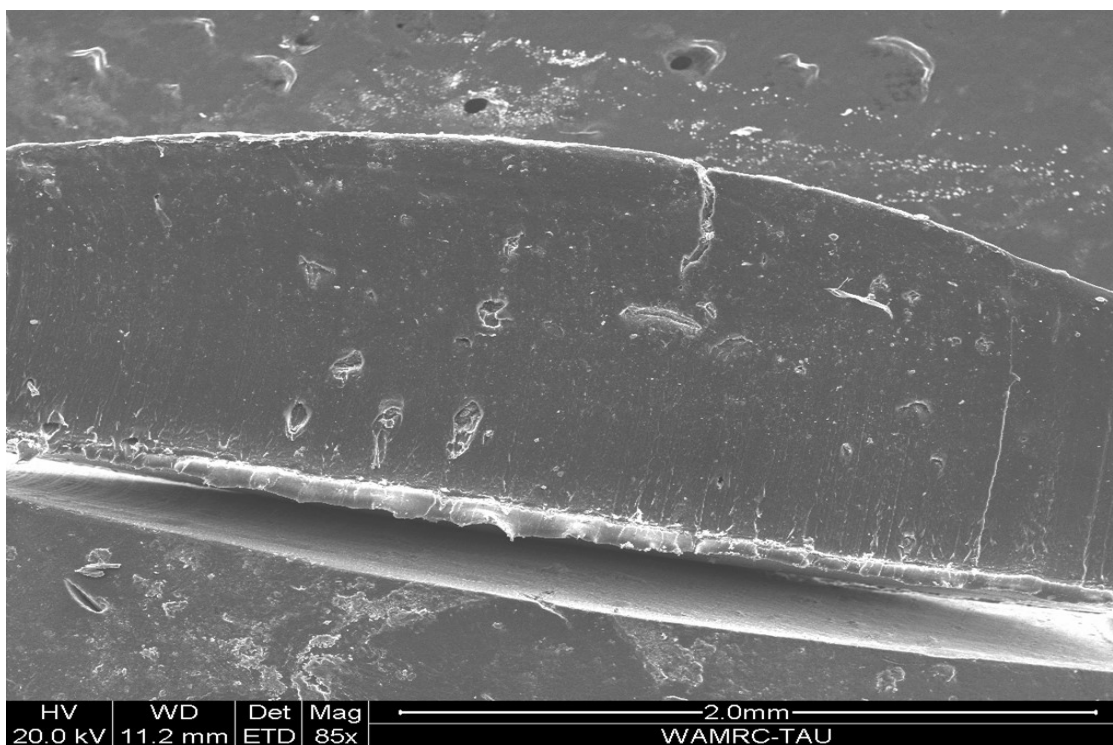


Figure S5 SEM image showing Side view of the pristine hydrogel