Supplementary materials

Microwave-Assisted Synthesis of Pt/SnO_2 for the Catalytic Reduction of 4-Nitrophenol to 4-Aminophenol

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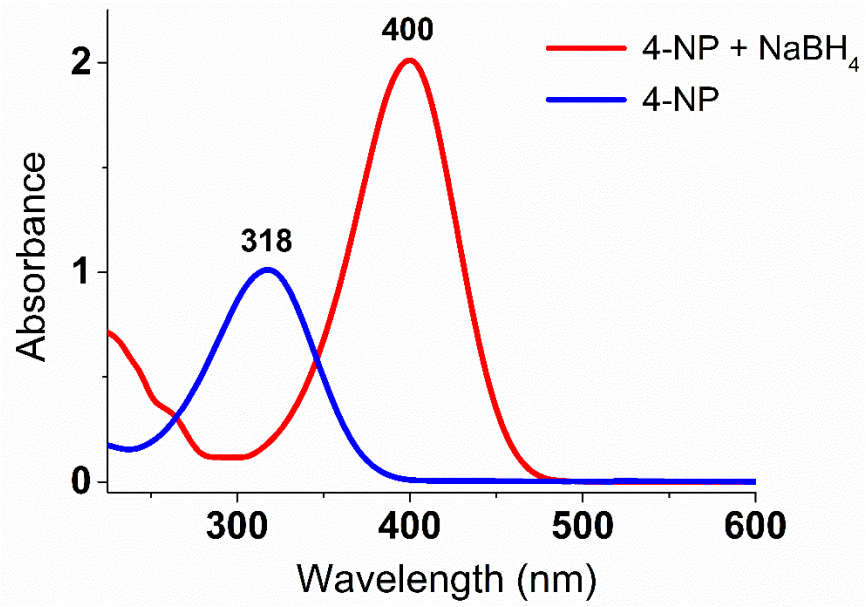

Fig. S1 UV-Vis spectra of the aqueous solution of pure 4-nitrophenol with the maximum at 318 nm and 4-nitrophenolate ions after addition of $NaBH_4$ (alkaline aqueous solution) with maximum at 400 nm.

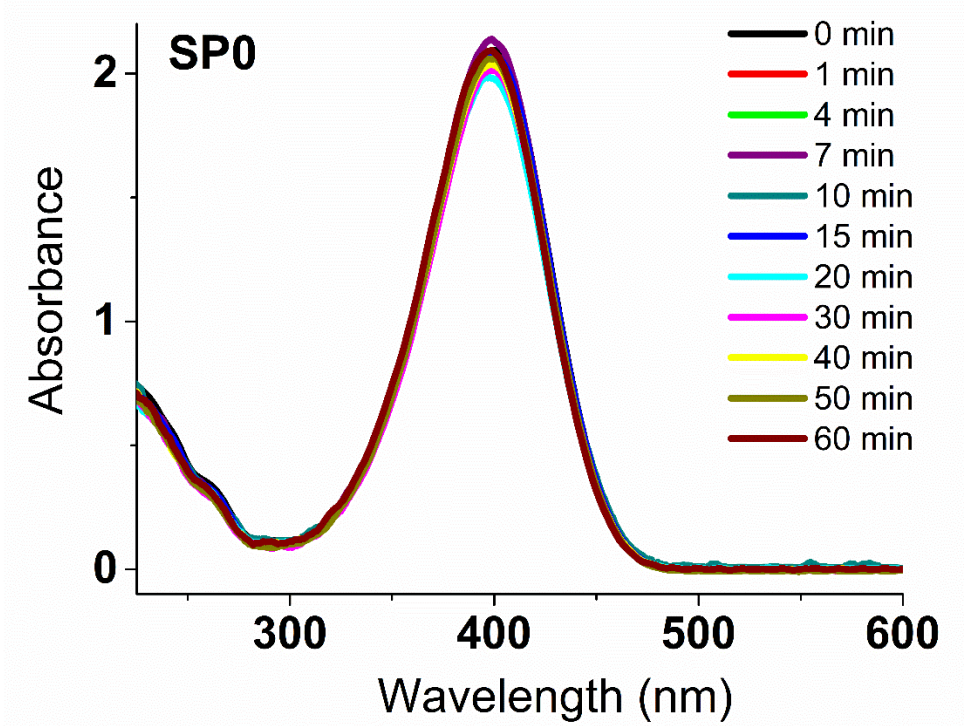

Fig. S2 Catalytic reduction of 4-nitrophenol (4-NP) to 4-aminophenol (4-AP) as a function of time using sample SP0, which does not contain platinum. This sample is completely inactive for the reduction of 4-NP to 4-AP.

Table S1 The peak positions and relative proportions (%) of Pt^{4+}, Pt^{2+}, Pt^{0}, Sn^{4+} and Sn^{2+} in the synthesized samples based on the deconvoluted Pt 4f and Sn 3d spectra.

Sample	Electron configuration	Binding energy / eV	Pt / %	Electron configuration	Binding energy / eV	Sn / %
SP1	Pt^{4+} $4f_{5/2}$	–	Pt^{4+} / 0	Sn^{4+} $3d_{3/2}$	495.2	Sn^{4+} / 96.6
	Pt^{4+} $4f_{7/2}$	–		Sn^{4+} $3d_{5/2}$	486.8	
	Pt^{2+} $4f_{5/2}$	75.7	Pt^{2+} / 36.8	Sn^{2+} $3d_{3/2}$	493.8	Sn^{2+} / 3.4
	Pt^{2+} $4f_{7/2}$	72.5		Sn^{2+} $3d_{5/2}$	485.4	
	Pt^{0} $4f_{5/2}$	74.0	Pt^{0} / 63.2	Sn^{0} $3d_{3/2}$	–	Sn^{0} / 0
	Pt^{0} $4f_{7/2}$	70.8		Sn^{0} $3d_{5/2}$	–	
	Pt 4f	**eV**	**Pt / %**	**Sn 3d**	**eV**	**Sn / %**
SP3	Pt^{4+} $4f_{5/2}$	–	Pt^{4+} / 0	Sn^{4+} $3d_{3/2}$	495.1	Sn^{4+} / 97.1
	Pt^{4+} $4f_{7/2}$	–		Sn^{4+} $3d_{5/2}$	486.6	
	Pt^{2+} $4f_{5/2}$	75.7	Pt^{2+} / 19.9	Sn^{2+} $3d_{3/2}$	493.6	Sn^{2+} / 2.9
	Pt^{2+} $4f_{7/2}$	72.4		Sn^{2+} $3d_{5/2}$	485.2	
	Pt^{0} $4f_{5/2}$	74.0	Pt^{0} / 80.1	Sn^{0} $3d_{3/2}$	–	Sn^{0} / 0
	Pt^{0} $4f_{7/2}$	70.8		Sn^{0} $3d_{5/2}$	–	
	Pt 4f	**eV**	**Pt / %**	**Sn 3d**	**eV**	**Sn / %**
SP5	Pt^{4+} $4f_{5/2}$	77.5	Pt^{4+} / 7.8	Sn^{4+} $3d_{3/2}$	495.2	Sn^{4+} / 96.1
	Pt^{4+} $4f_{7/2}$	74.3		Sn^{4+} $3d_{5/2}$	486.8	
	Pt^{2+} $4f_{5/2}$	75.8	Pt^{2+} / 24.6	Sn^{2+} $3d_{3/2}$	493.6	Sn^{2+} / 3.9
	Pt^{2+} $4f_{7/2}$	72.5		Sn^{2+} $3d_{5/2}$	485.2	
	Pt^{0} $4f_{5/2}$	74.1	Pt^{0} / 67.6	Sn^{0} $3d_{3/2}$	–	Sn^{0} / 0
	Pt^{0} $4f_{7/2}$	70.8		Sn^{0} $3d_{5/2}$	–	
	Pt 4f	**eV**	**Pt / %**	**Sn 3d**	**eV**	**Sn / %**
SP10	Pt^{4+} $4f_{5/2}$	77.5	Pt^{4+} / 8.3	Sn^{4+} $3d_{3/2}$	495.1	Sn^{4+} / 97.1
	Pt^{4+} $4f_{7/2}$	74.3		Sn^{4+} $3d_{5/2}$	486.7	
	Pt^{2+} $4f_{5/2}$	75.8	Pt^{2+} / 25.8	Sn^{2+} $3d_{3/2}$	493.7	Sn^{2+} / 2.9
	Pt^{2+} $4f_{7/2}$	72.6		Sn^{2+} $3d_{5/2}$	485.3	
	Pt^{0} $4f_{5/2}$	74.2	Pt^{0} / 65.9	Sn^{0} $3d_{3/2}$	–	Sn^{0} / 0
	Pt^{0} $4f_{7/2}$	70.9		Sn^{0} $3d_{5/2}$	–	
	Pt 4f	**eV**	**Pt / %**	**Sn 3d**	**eV**	**Sn / %**
SP15	Pt^{4+} $4f_{5/2}$	77.5	Pt^{4+} / 16.3	Sn^{4+} $3d_{3/2}$	495.3	Sn^{4+} / 92.2
	Pt^{4+} $4f_{7/2}$	74.3		Sn^{4+} $3d_{5/2}$	486.8	
	Pt^{2+} $4f_{5/2}$	75.7	Pt^{2+} / 29.8	Sn^{2+} $3d_{3/2}$	493.4	Sn^{2+} / 7.8
	Pt^{2+} $4f_{7/2}$	72.5		Sn^{2+} $3d_{5/2}$	485.0	
	Pt^{0} $4f_{5/2}$	74.1	Pt^{0} / 53.9	Sn^{0} $3d_{3/2}$	–	Sn^{0} / 0
	Pt^{0} $4f_{7/2}$	70.8		Sn^{0} $3d_{5/2}$	–	

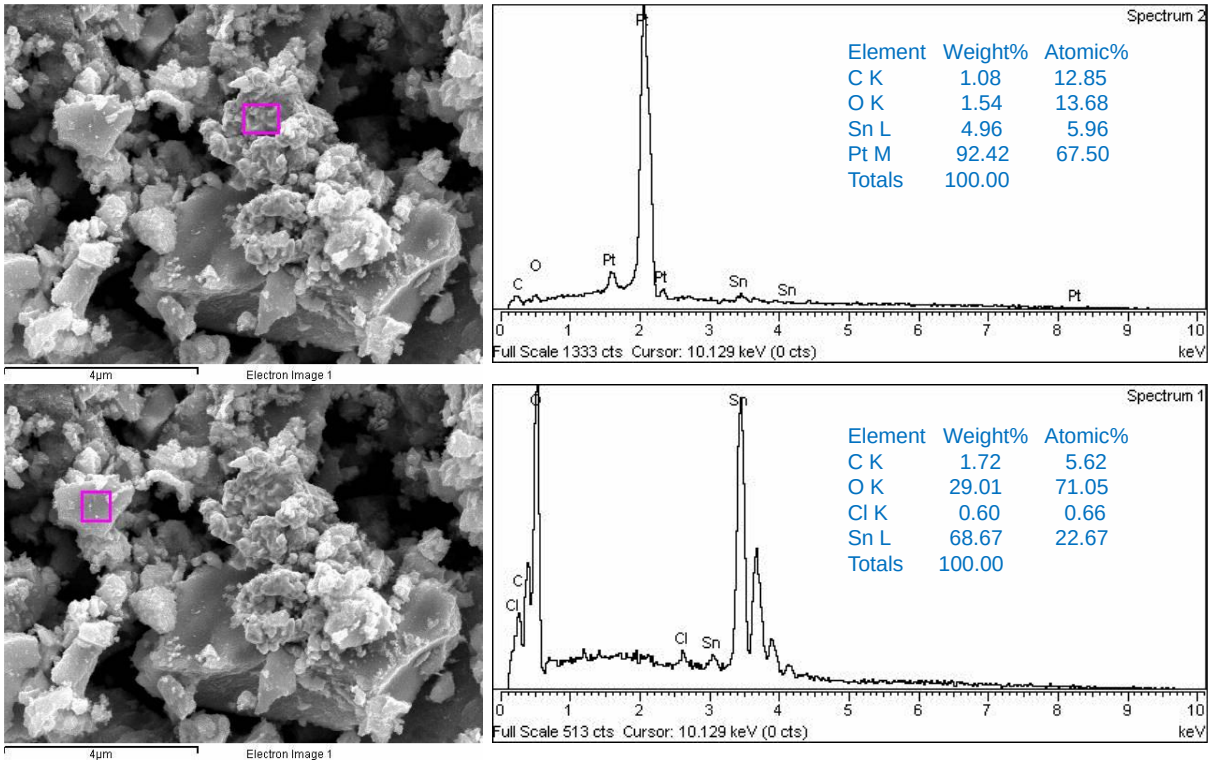

Fig. S3 SEM EDS results of sample SP3. EDS analyses were taken from two different marked sites showing the platinum rich region (upper panel) and SnO_2 rich region (lower panel).

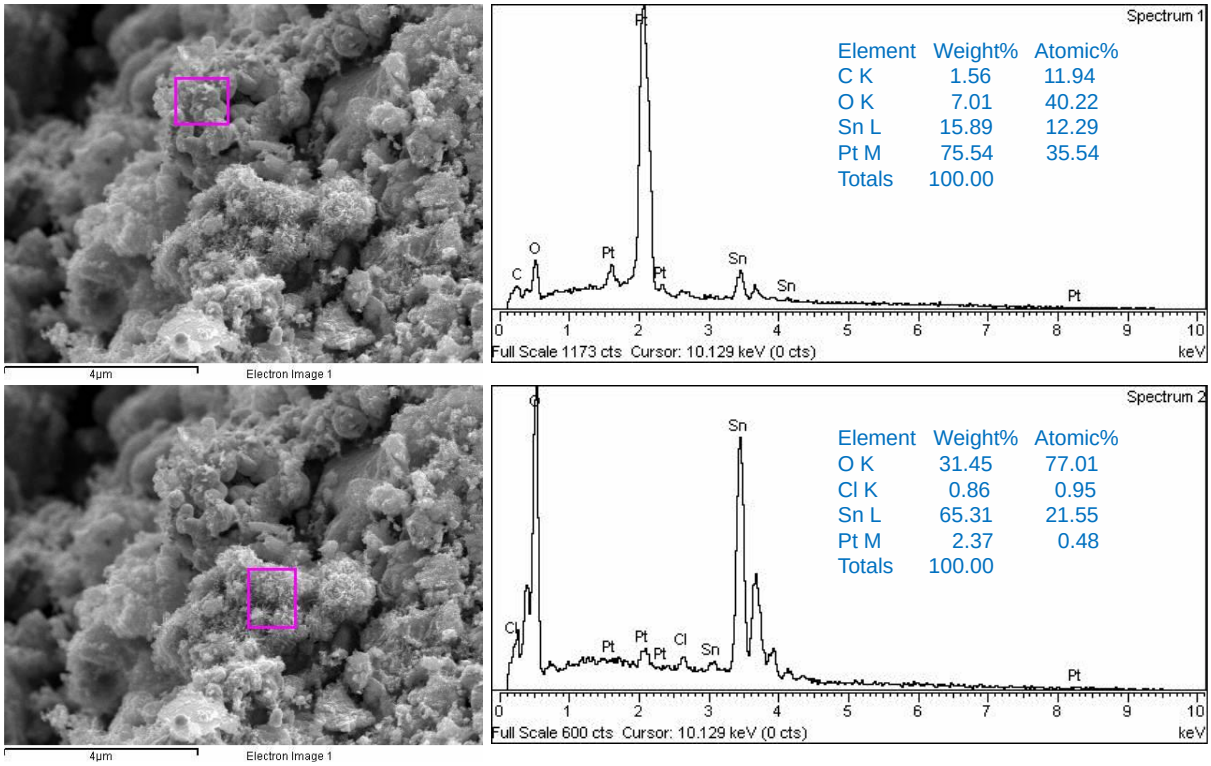

Fig. S4 SEM EDS results of sample SP5. EDS analyses were taken from two different marked sites showing the platinum rich region (upper panel) and SnO_2 rich region (lower panel).

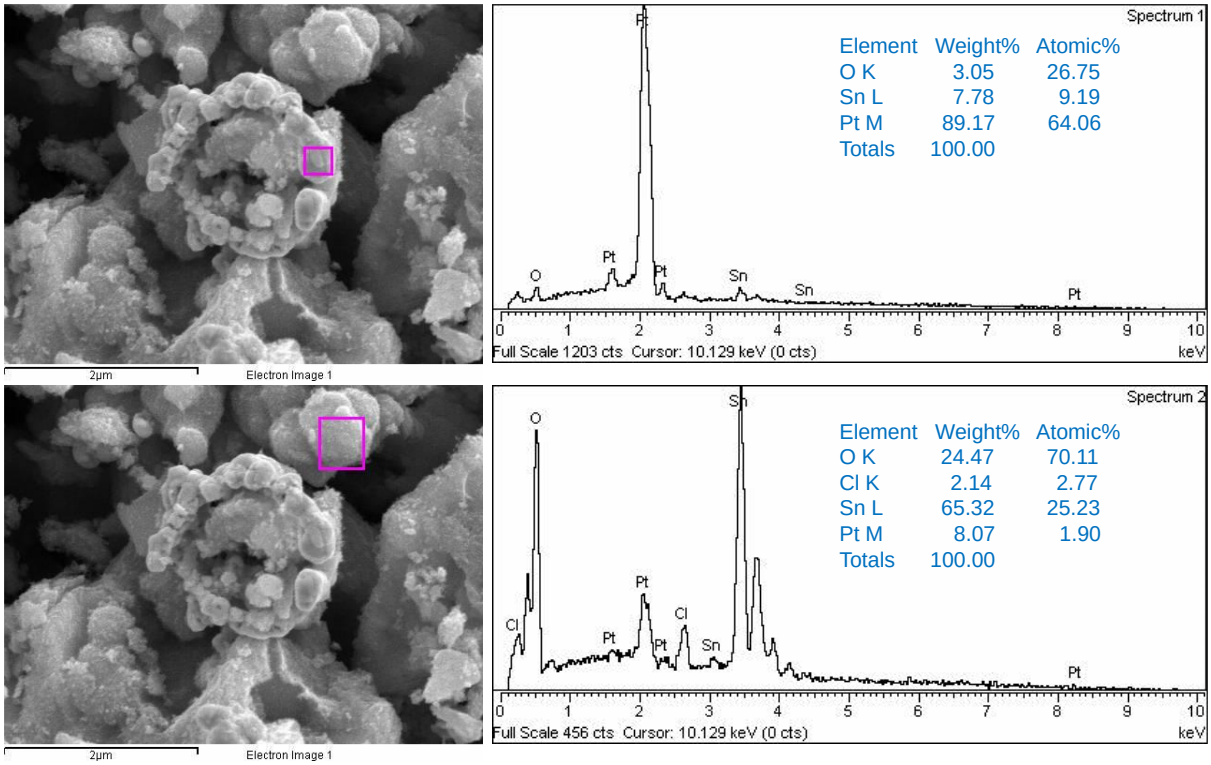

Fig. S5 SEM EDS results of sample SP10. EDS analyses were taken from two different marked sites showing the platinum rich region (upper panel) and SnO_2 rich region (lower panel).

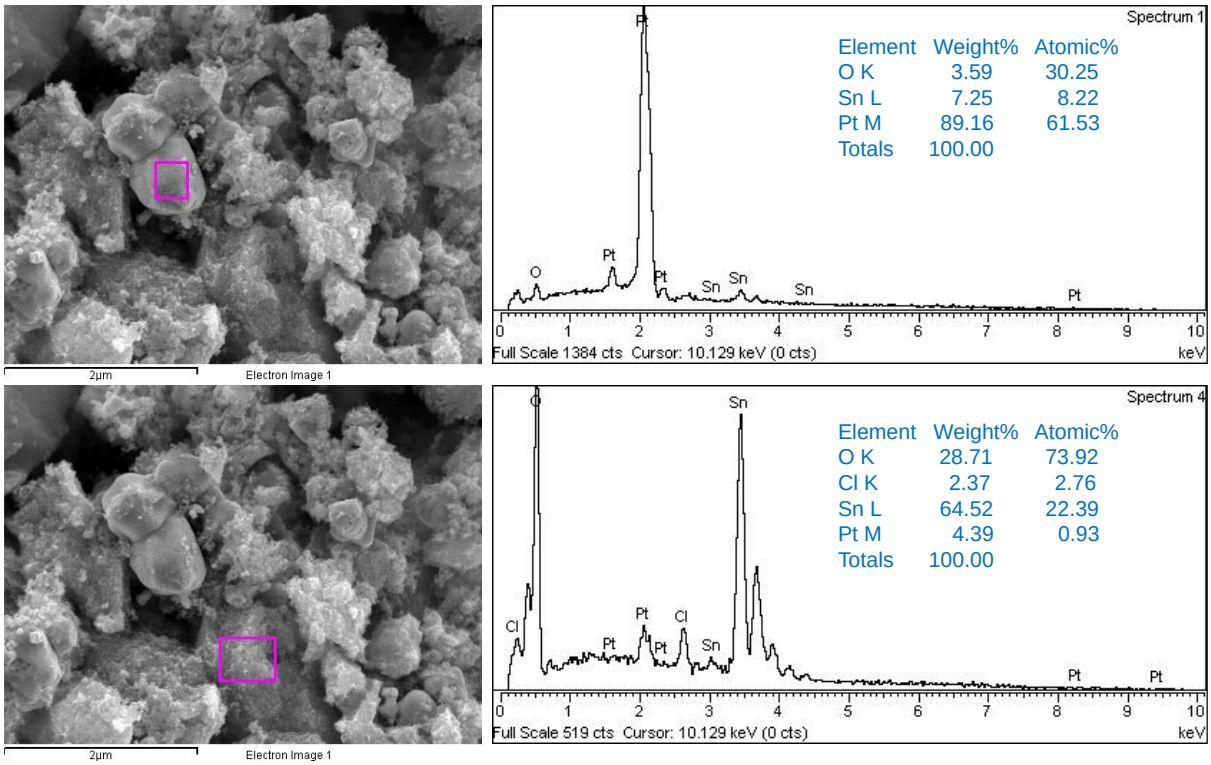

Fig. S6 SEM EDS results of sample SP15. EDS analyses were taken from two different marked sites showing the platinum rich region (upper panel) and SnO_2 rich region (lower panel).

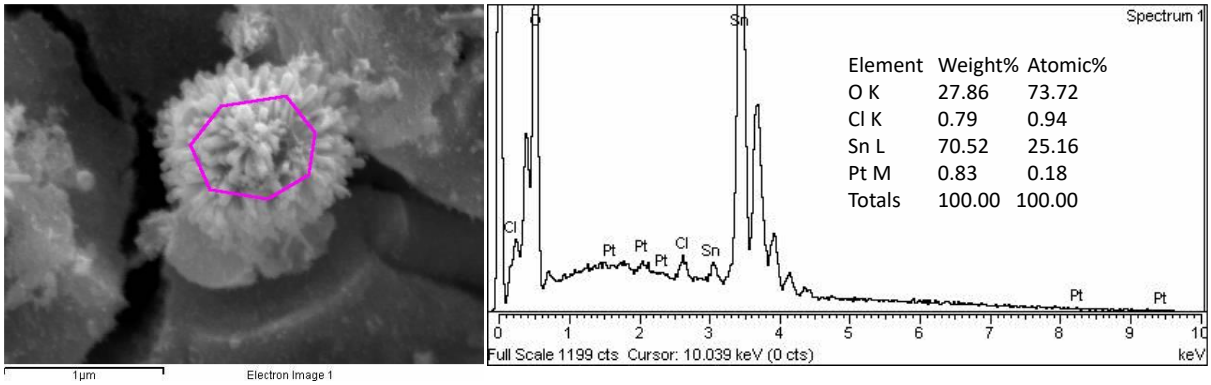

Fig. S7 SEM EDS results of urchin-like particle in sample SP5. The image shows anisotropic urchin-like particles. EDS analyses taken from the marked sites showing that the urchin-like particle mainly consisted of SnO_2.