Supplementary Material (ESI) for Green Chemistry

Supporting Information File

Single Bilayered Organic Nanotubes: Anchors for Production of a Reusable Catalyst with Nickel Ions

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Contents:

1. XRPD spectrum of Ni-ONT, before and after oxidation reactions.

X-ray powder diffraction (XRPD) was performed on a Rigaku R-AXIS IV X-ray diffractometer monochromated Cu-Kα radiation (40.0 kV, 30.0 mA) at room temperature.

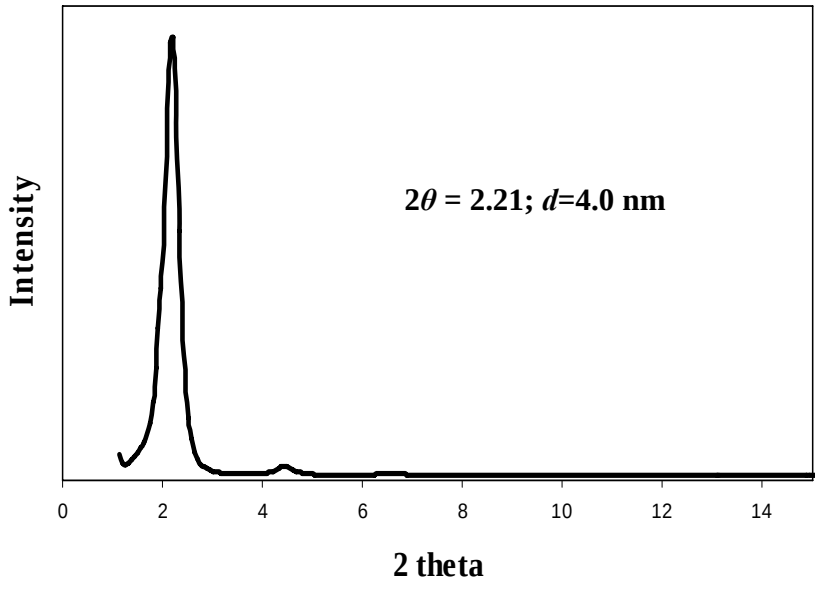

Fig. S1. XRPD spectrum of Ni-ONT, before oxidation reactions.

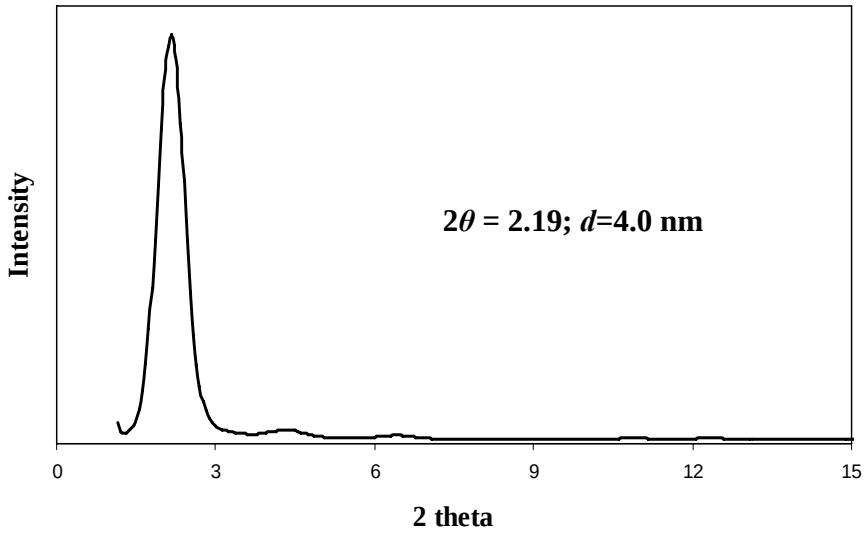

Fig. S2. XRPD spectrum of Ni-ONT, after oxidation reactions.

2. UV-Vis spectrum of filtrate, after 5 h stirring of Ni-ONT with 30% H_2O_2.

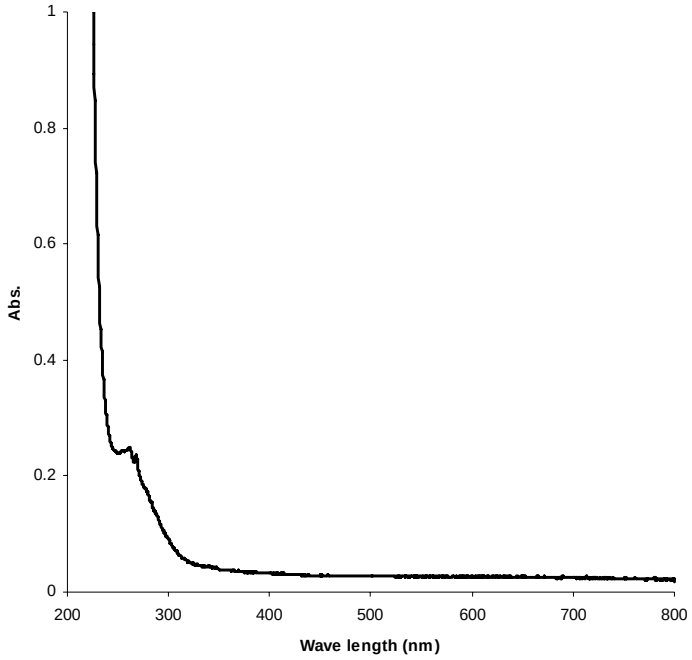

Fig. S3. UV-Vis spectrum of filtrate, after 5 h stirring of Ni-ONT with 30% H_2O_2.

3. FTIR spectrum of Ni-ONT, before and after oxidation reactions.

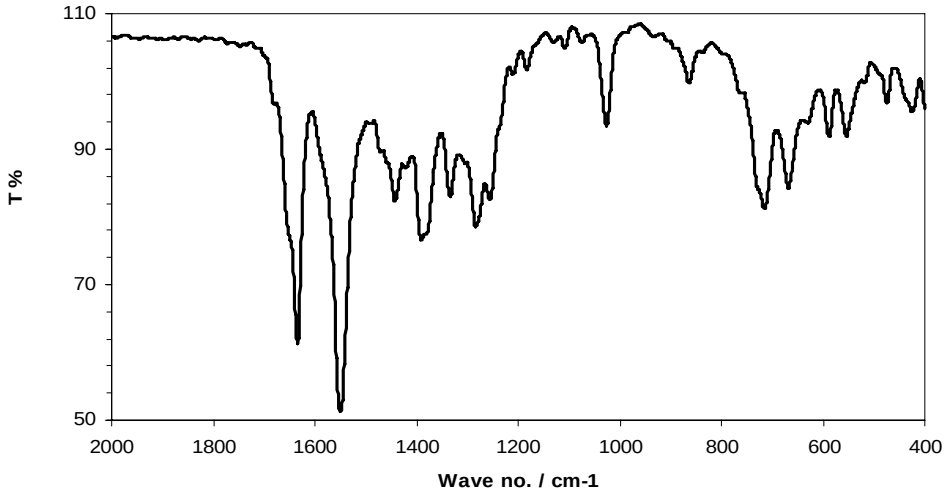

Fig. S4. FTIR spectrum of Ni-ONT, before oxidation reactions.

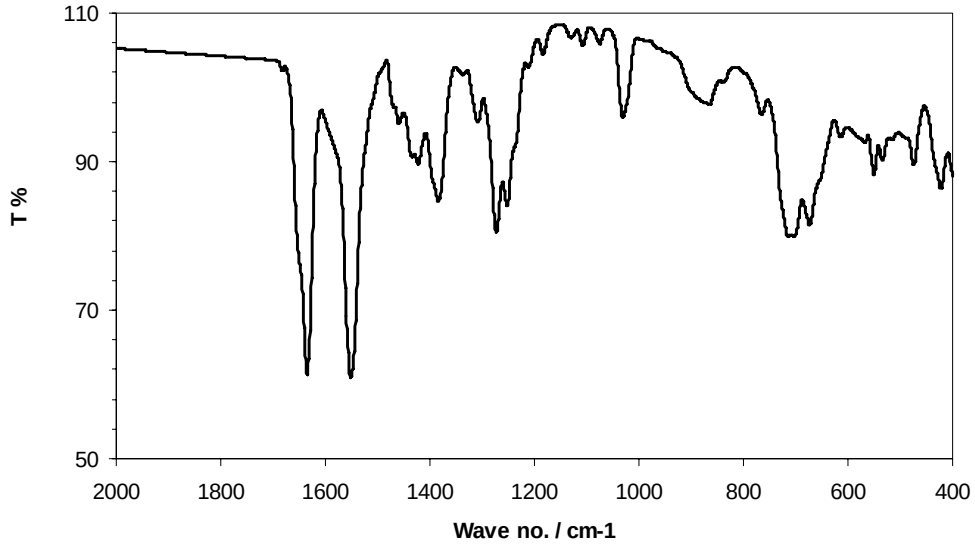

Fig. S5. FTIR spectrum of Ni-ONT, after oxidation reactions.

4. Turn Over Frequency (TOF) of Cu-ONT.

Table S1. TOF of Cu-ONT catalyzed oxidation with H_2O_2.

Substrates	Products	Conversion [d] (%)	Selectivity [d] (%)	TOF[e] (s^{-1})
Benzyl alcohol[a]	Benzaldehyde	25	81	11.25×10^{-4}
1-Phenylethanol[a]	Acetophenone	3	99	1.65×10^{-4}
1-Octanol[a]	1-Octanal	20	78	8.66×10^{-4}
2-Octanol[a]	2-Octanone	17	99	9.35×10^{-4}
Cinnamyl alcohol[b]	Cinnamaldehyde	17	87	8.21×10^{-4}
Cinnamaldehyde[c]	Cinnamic acid	16	67	5.96×10^{-4}
TMP[a]	TMQ	tr[e]	tr	-
Tetraline[a]	Tetralone	tr[e]	tr	-
Diphenylmethane[a]	Benzophenone	tr[e]	tr	-
α-Pinene[a]	α-Pinene oxide	15	83	6.92×10^{-4}
Styrene[a]	Styrene oxide	18	77	7.70×10^{-4}

Reaction conditions: [a] Cu-ONT (0.01 mmol), alcohols (1 mmol), 30% H_2O_2 (15 mmol), and CH_3CN (5 ml), were stirred at 60 $^{\circ}$C for 5 h in air; [b] (0.01 mmol), substrate (1 mmol),

10% H_2O_2 (2 mmol), 5 ml CH_3CN, stirring 5 h at 60 °C. [c] Cu-ONT complex **1** (0.01 mmol), substrate (1 mmol), 30% H_2O_2 (3 mmol), 5 ml CH_3CN, stirring 5 h at 60 °C. [d] Determined by GC analysis on the basis of substrate charged with biphenyl as internal standard. [e] tr = trace. [f] TOF = Turn over number (TON) / s after 1 h.

5. Reuse of Ni-ONT.

Table S2. Reuse of Ni-ONT with H_2O_2 for oxidation reactions.

Reused Number	1	2	3	4	5
Substrate	Conversion[c], Selectivity[c] (%)	Conversion[c], Selectivity[c] (%)	Conversion[c], Selectivity[c] (%)	Conversion[c], Selectivity[c] (%)	Conversion[c], Selectivity[c] (%)
2-Octanol[a]	61, 99	62, 99	60, 99	61, 99	63, 99
Cinnamaldehyde[b]	33, 86	32, 83	34, 82	33, 86	32, 84
TMP[a]	56, 90	55, 92	56, 94	53, 91	55, 89
Diphenylmetane[a]	58, 99	57, 99	57, 99	58, 99	56, 99
Styrene[a]	41, 87	43, 88	40, 87	39, 89	41, 88

Reaction conditions: [a] Ni-ONT (0.02 mmol), substrate (2 mmol), 30% H_2O_2 (2 mmol), stirring 5 hr at 25 ºC. [b] Ni-ONT (0.02 mmol), substrate (2 mmol), 10% H_2O_2 (2 mmol), stirring 5 hr at 25 ºC. [c] Determined by GC analysis on the basis of substrate charged with biphenyl as internal standard.