

## Supporting Information

### Highly selective hydrogenation of aromatic ketones to alcohols in water: effect of PdO and ZrO<sub>2</sub>.

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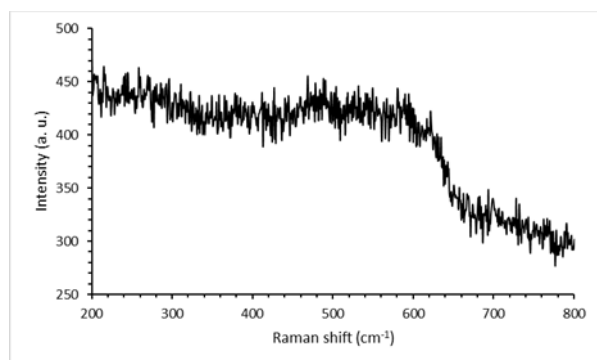


Figure S1. Raman spectrum of ZrO<sub>2</sub>.

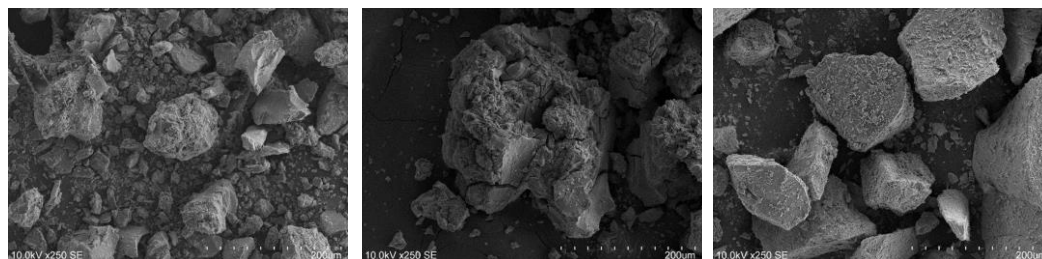


Figure S2. SEM images of a) **I**, b) **II** and c) **III**.

Table S1. The EDX analysis of catalysts **I**, **II** and **III**.

Catalyst	Atom %					
	C	N	O	Na	Zr	Pd
<b>I</b>	31.6	9.2	49.4	1.7	5.6	2.5
<b>II</b>	7	6.5	61.4	3.3	14	7.8
<b>III</b>	17.7	4.5	58.6	8.5	7.4	3.3

Table S2. XPS surface composition, atom %.

	<b>Pd</b> Pd 3d5/2	<b>O</b> O 1s	<b>Zr</b> Zr 3d	<b>C</b> C 1s	<b>Pd/Zr</b>
<b>I</b>	18.5	22.8	12.9	45.8	1.43
<b>II</b>	4.8	46	21.5	27.7	0.22
<b>III</b>	7.2	41.5	13	38.3	0.55
ZrO <sub>2</sub> /Zr <sub>foil</sub>		51.0	26.0	23.0	

Table S3. Hydrogenation of AP in different solvents.

Entry	Catalyst	pH <sub>2</sub> , bar	T, °C	t	Solvent	Conv. %	PE, %	EB %
1	II	10	80	1	MeOH	6	6	0
2		10	80	1	Anisole	12	12	0

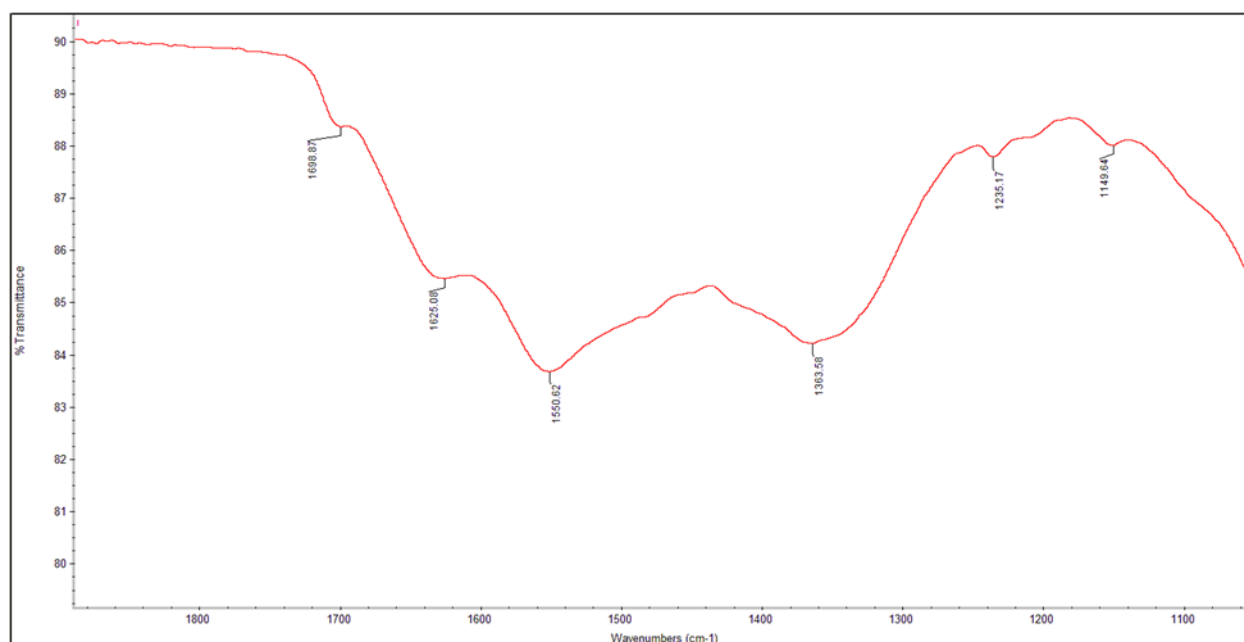


Figure S3. ATR-FTIR spectrum of AP adsorbed on catalyst **I**. (Catalyst **I** (10 mg) was mixed with AP (0.015 mL) in water (1 mL) for 24 h. Next, **I** was separated by centrifugation and dried under N<sub>2</sub>).

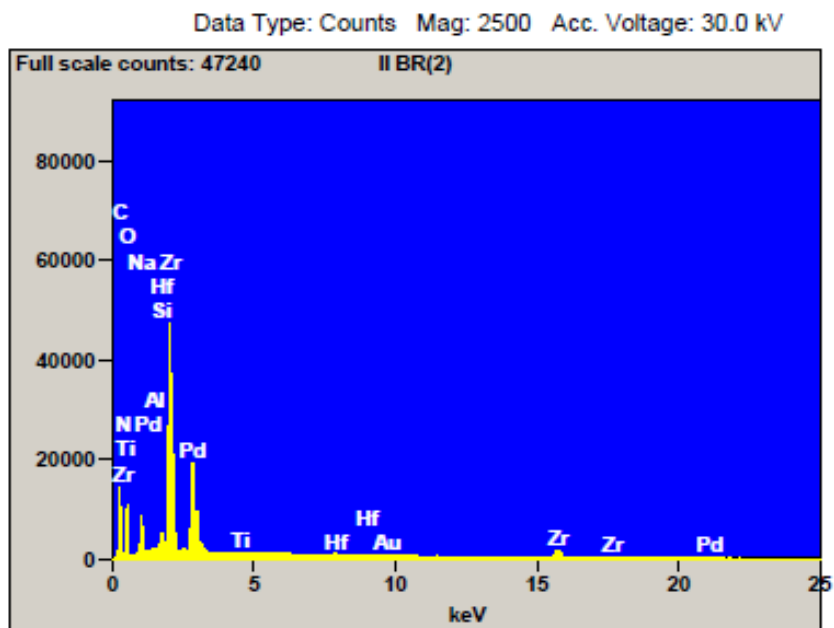


Figure S 4. EDS spectrum of catalyst II before reaction.

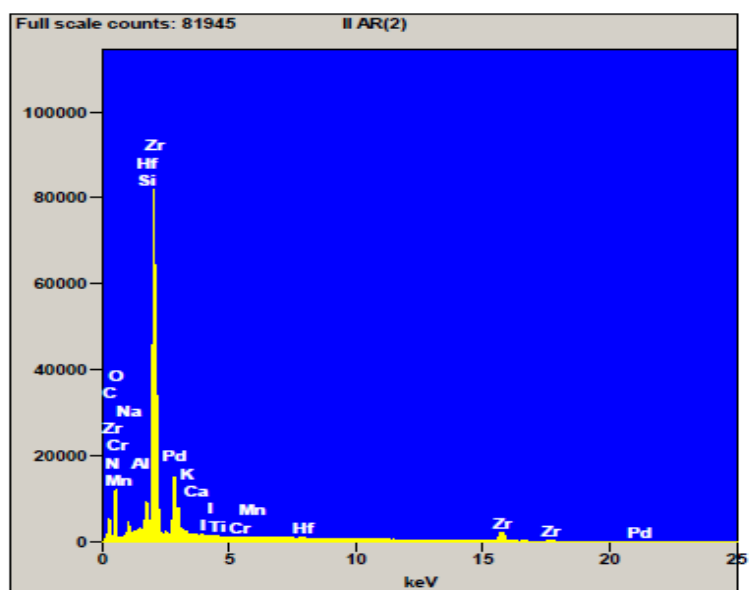


Figure S 5. EDS spectrum of catalyst II after reaction.

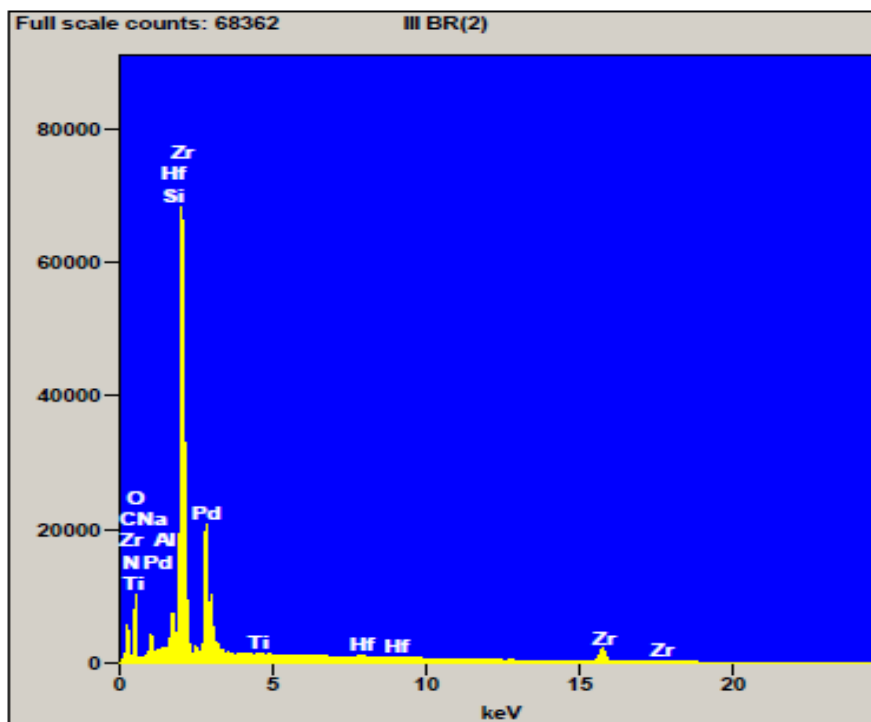


Figure S 6. EDS spectrum of catalyst III before reaction.

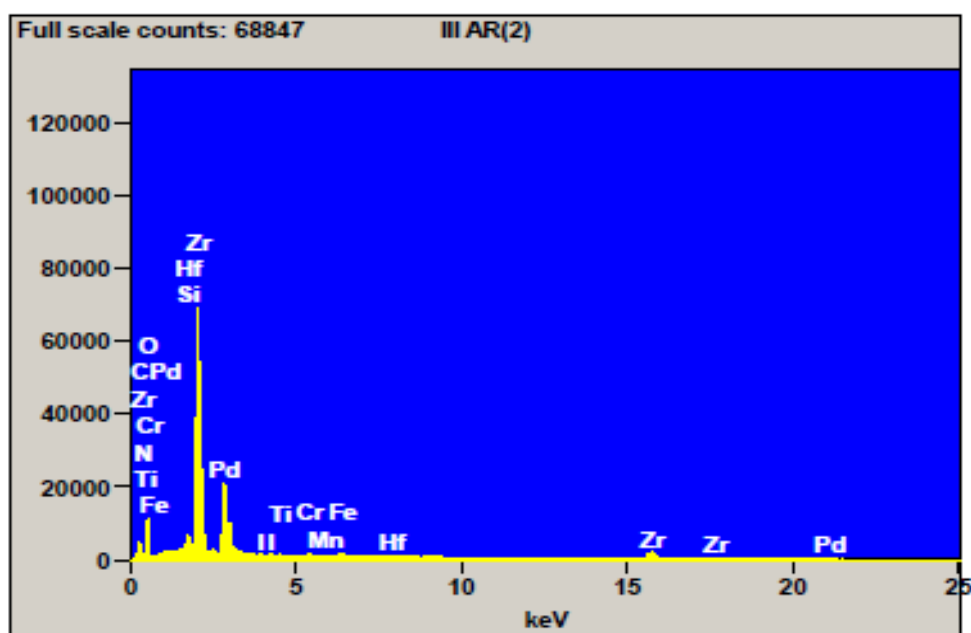


Figure S 7. EDS spectrum of catalyst III after reaction.

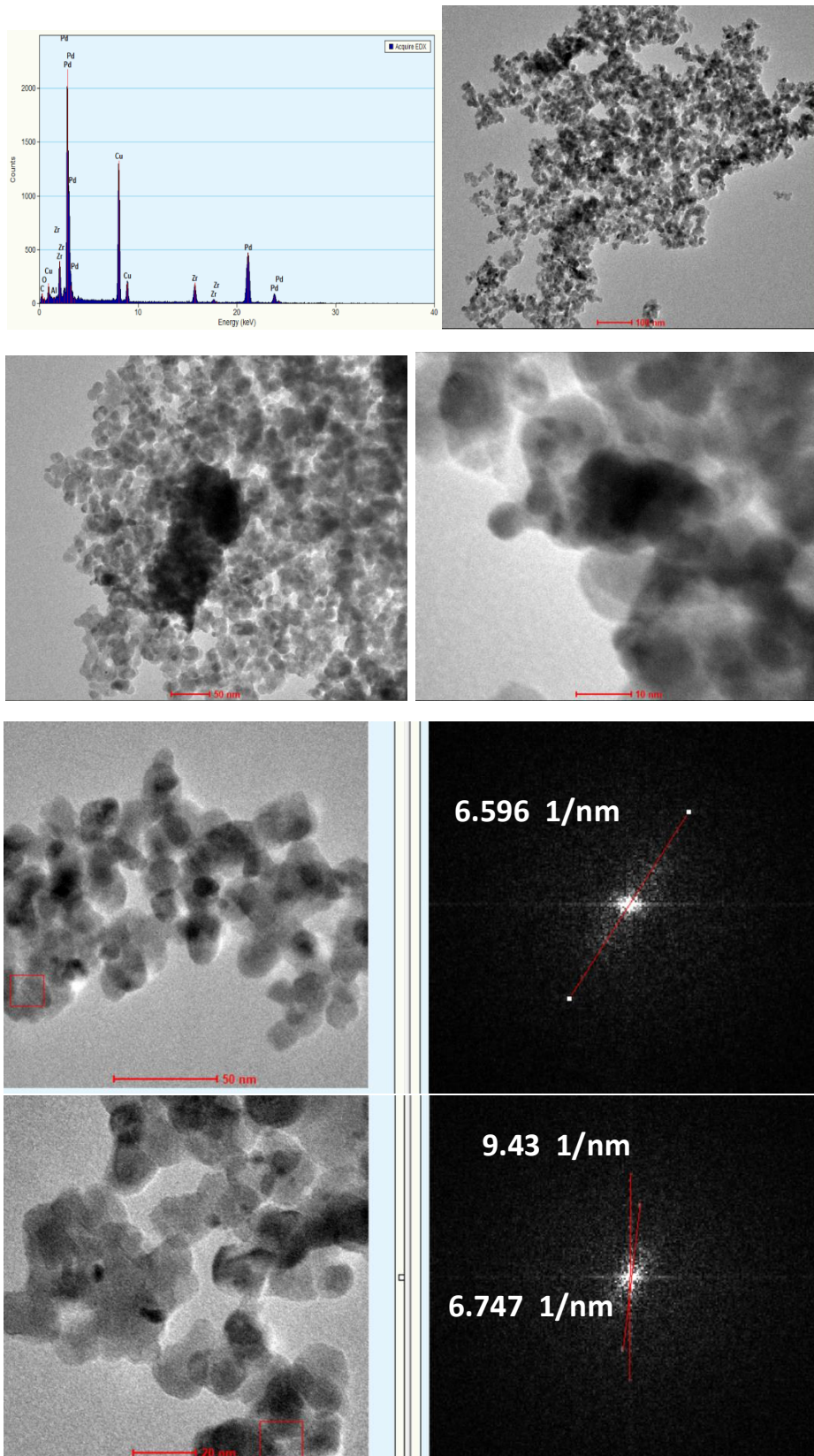


Figure S 8. EDX spectrum and TEM images of catalyst II after recycling reaction.

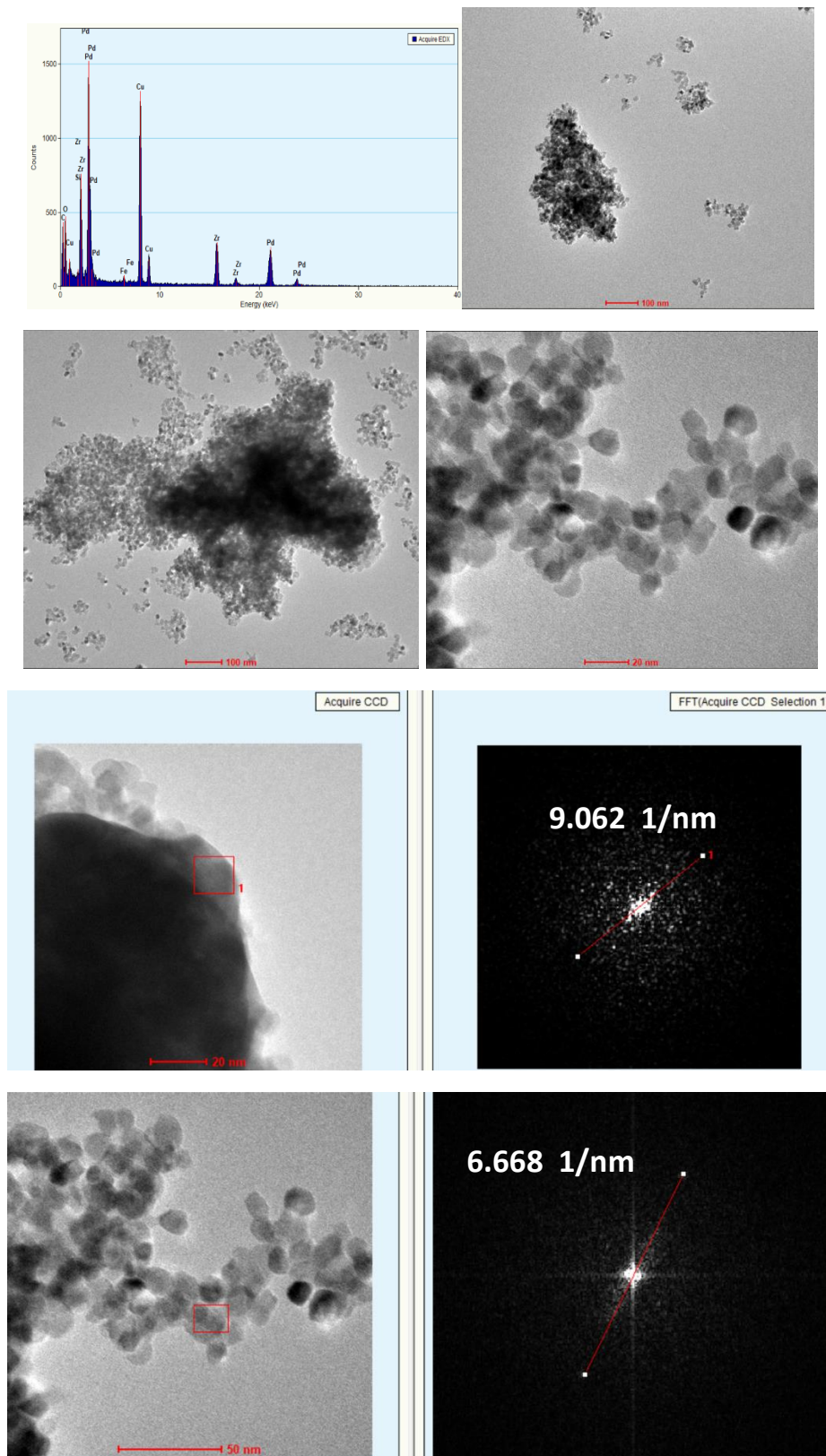
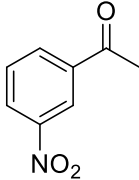
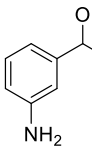
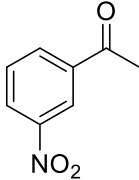
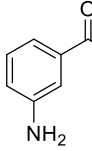
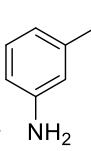
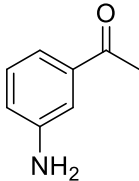
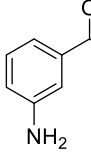
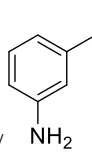

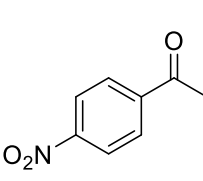
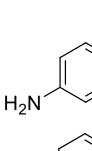
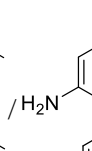
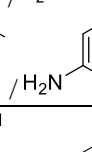
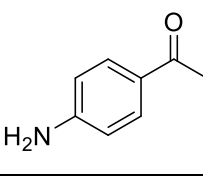
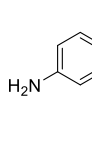
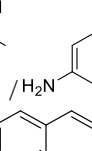
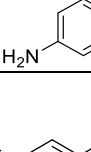
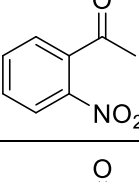
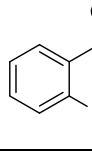
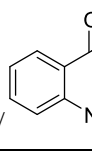
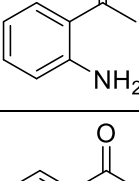
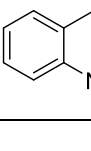
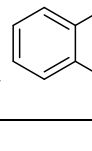
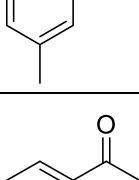
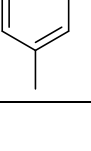
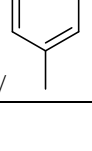
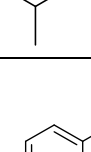
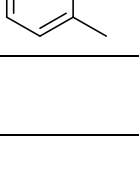
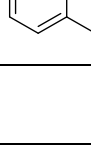
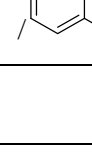

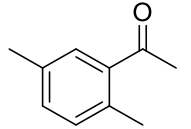
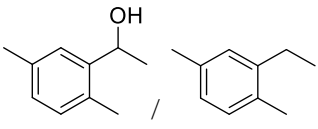
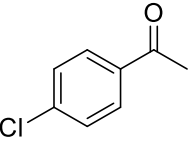
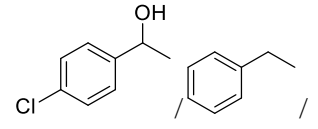
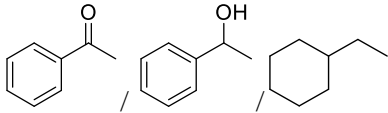
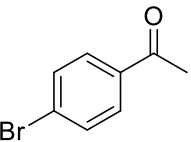
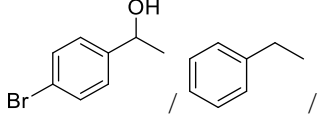
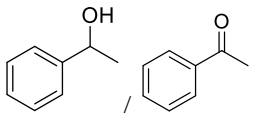


Figure S 9. EDX spectrum and TEM images of catalyst III after recycling experiment.

Table S4. Hydrogenation of differently substituted acetophenones catalyzed by I and II

Entry	Substrate	Catalyst	Product	Conv.%	Yield %
1		<b>I</b>		100	93/1.5/5.5
2		<b>II</b>		88	1/87/0
3 <sup>a</sup>				100	95/4.5/0.5
4		<b>I</b>		93	88/5
5		<b>II</b>		24	24/0
6 <sup>a</sup>				41	41/0
7		<b>I</b>		100	58/7/26/9
8 <sup>a</sup>		<b>II</b>	 	40	2/38/0/0
9		<b>I</b>		65	47/10/8
10 <sup>a</sup>		<b>II</b>	 	35	30/2/3
11		<b>I</b>		100	12/85/3
12 <sup>a</sup>		<b>II</b>		100	7/92/1
13		<b>I</b>		25	22/3
14 <sup>a</sup>		<b>II</b>		11	101
15		<b>I</b>		96	76/20
16		<b>II</b>		45	44/1
17 <sup>a</sup>				95	94/1
18		<b>I</b>		45	41/4
19		<b>II</b>		24	16/8
20 <sup>a</sup>				52	47/5
21		<b>I</b>		57	52/5

22 <sup>a</sup>		<b>II</b>		5	5
23		<b>I</b>		65	3/56/3/3/0
24 <sup>a</sup>		<b>II</b>		98	0/96/0/0/2
25		<b>I</b>		100	0/100/0/0
26		<b>II</b>		100	0/61/2/37

GS-MS spectra of the hydrogenation reaction products:

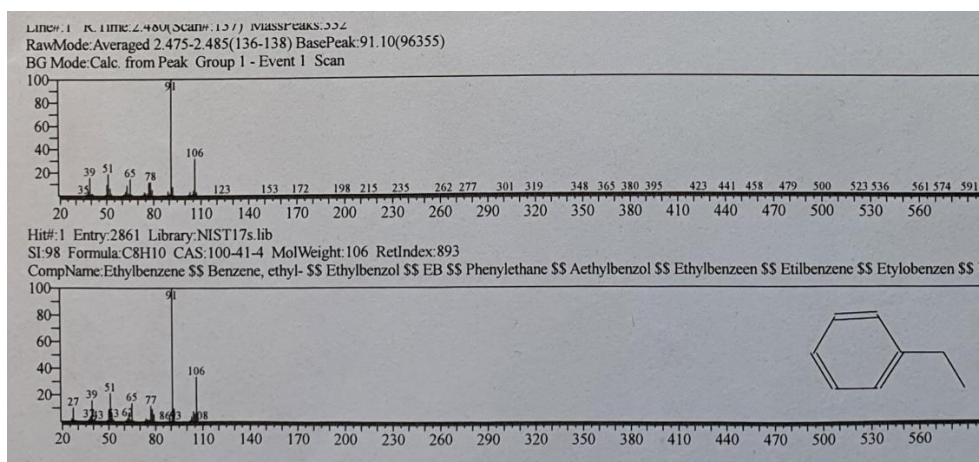


Figure S 10. MS spectra of Ethylbenzene



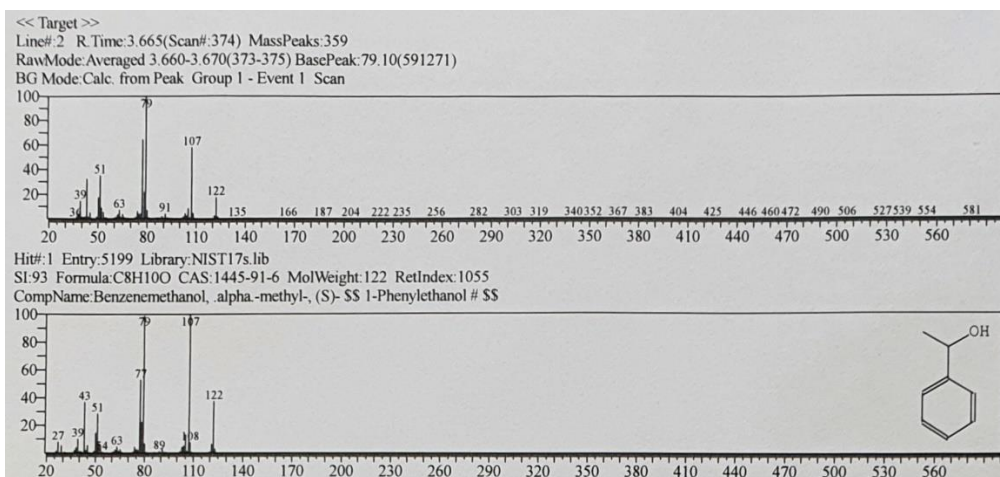


Figure S 11. MS spectra of 1-phenylethanol

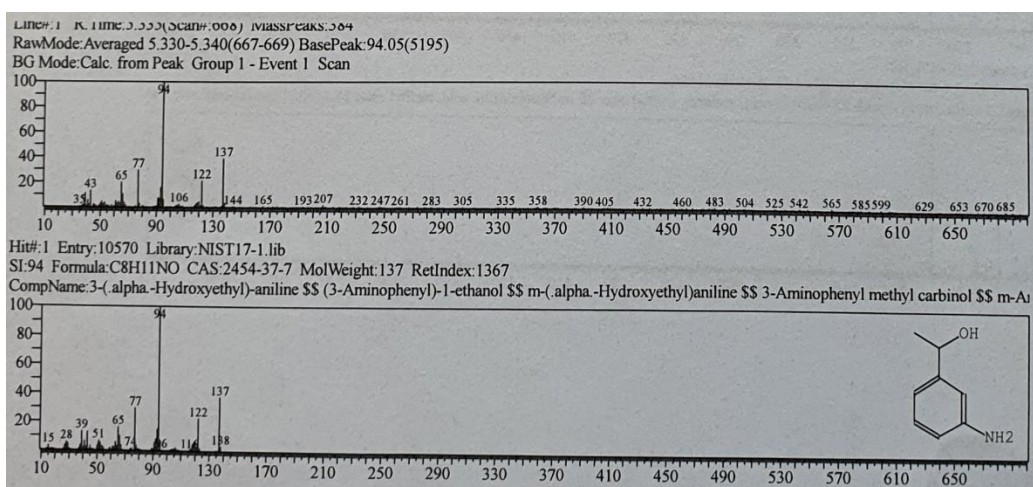


Figure S 12. MS spectra of 1-(3-Aminophenyl)ethanol

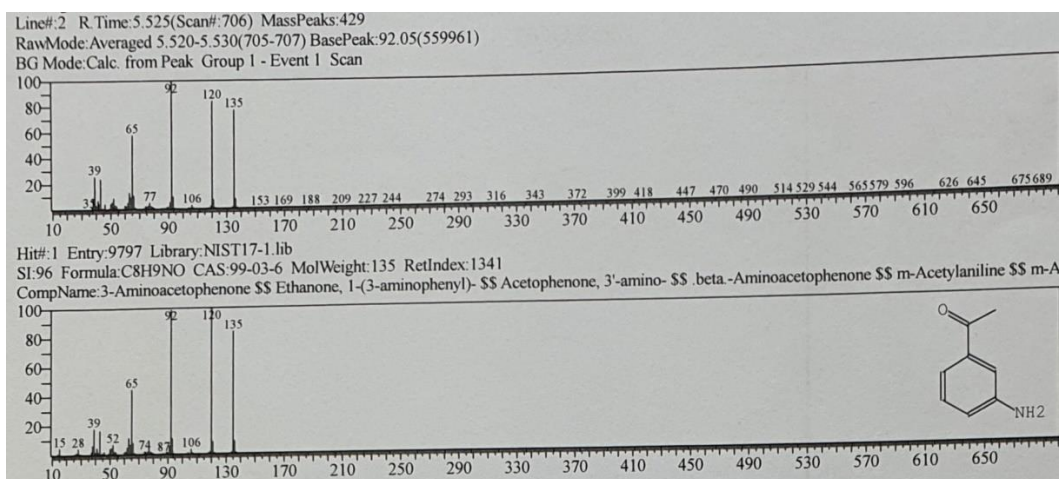


Figure S 13. MS spectra of 3-Aminoacetophenone

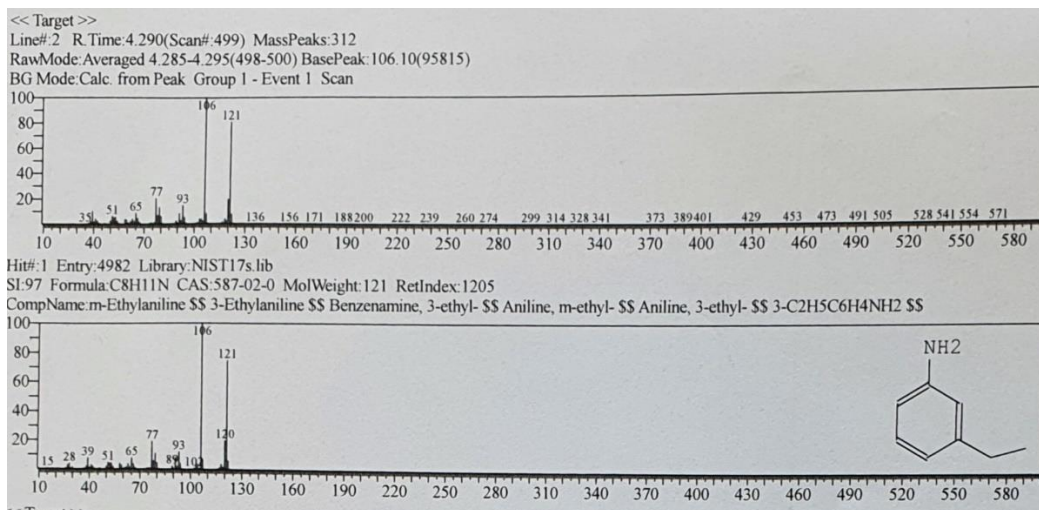


Figure S 14. MS spectra of 3-Ethylaniline

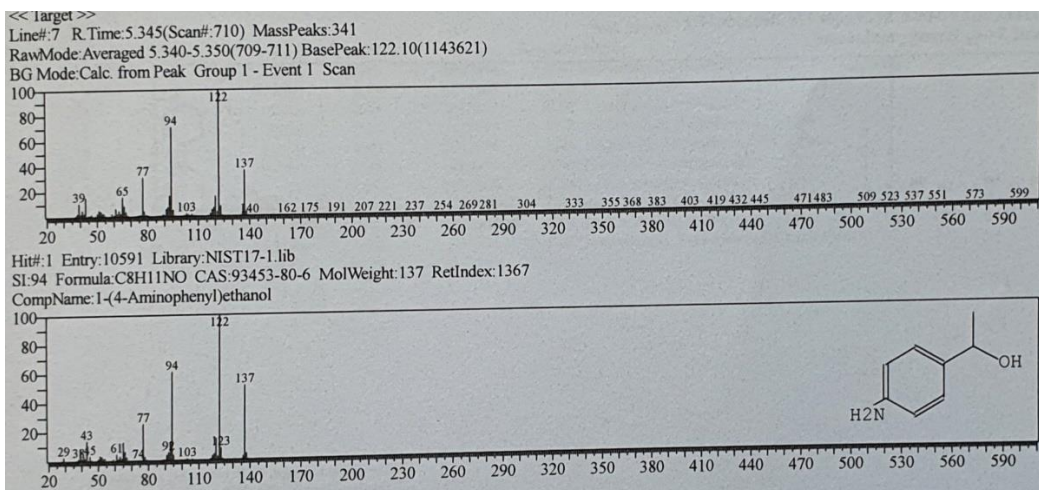


Figure S 15. MS spectra of 1-(4-Aminophenyl)ethanol

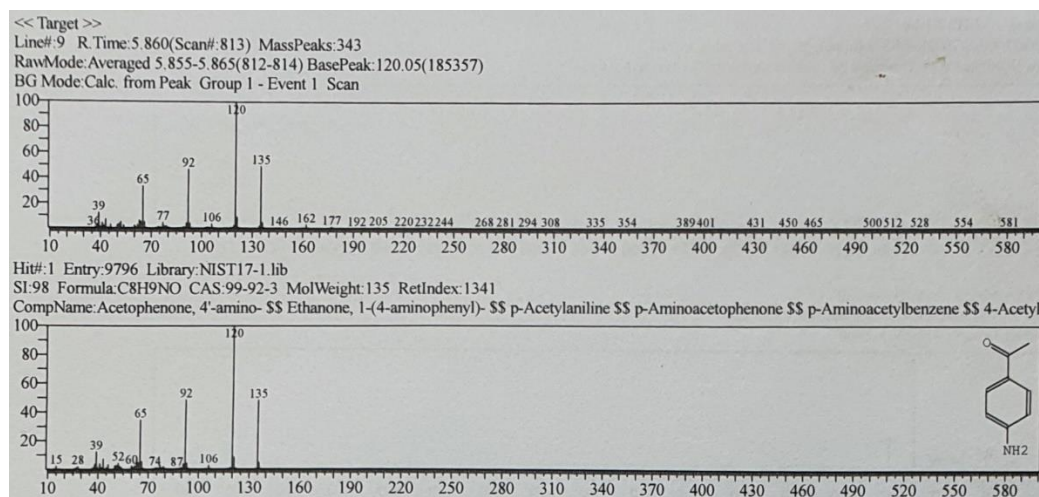


Figure S 16. MS spectra of 4-Aminoacetophenone

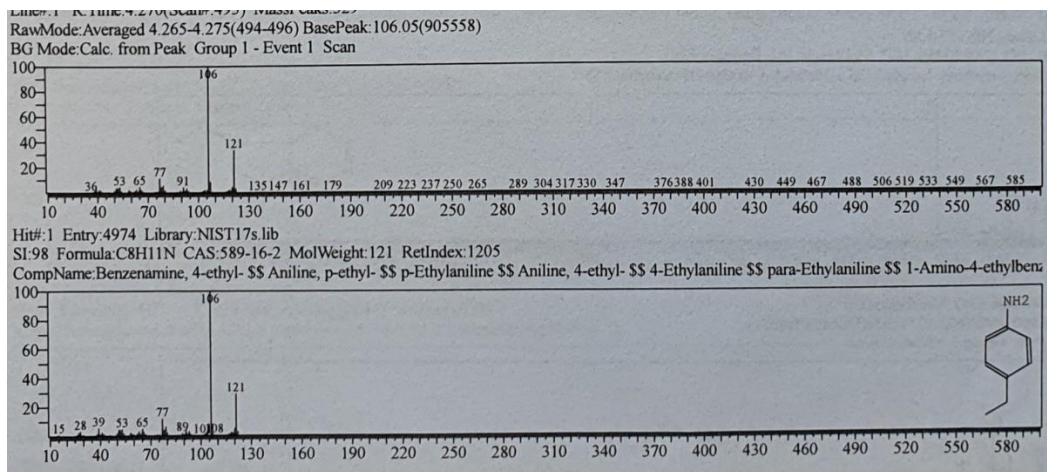


Figure S 17. MS spectra of 4-Ethylaniline

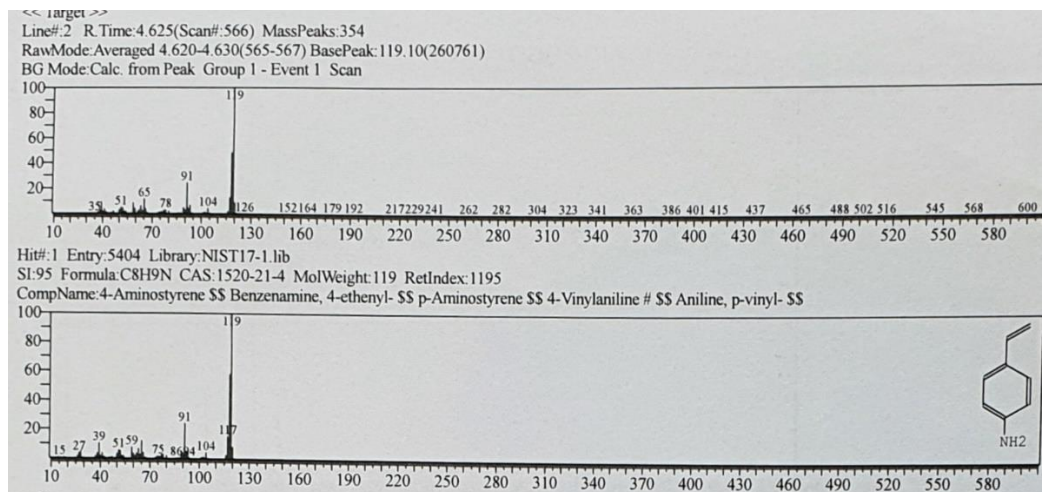


Figure S 18. MS spectra of 4-Aminostyrene

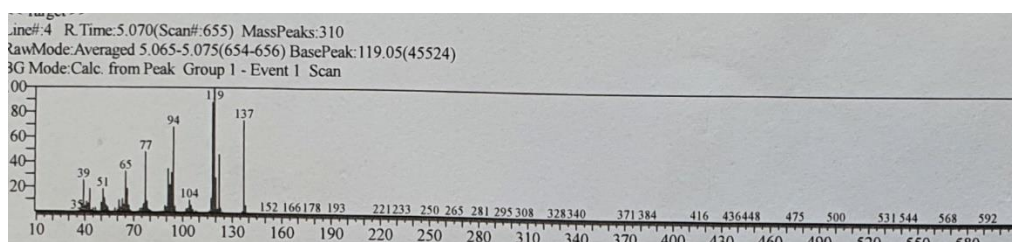


Figure S 19. MS spectra of 1-(2-Aminophenyl)ethanol

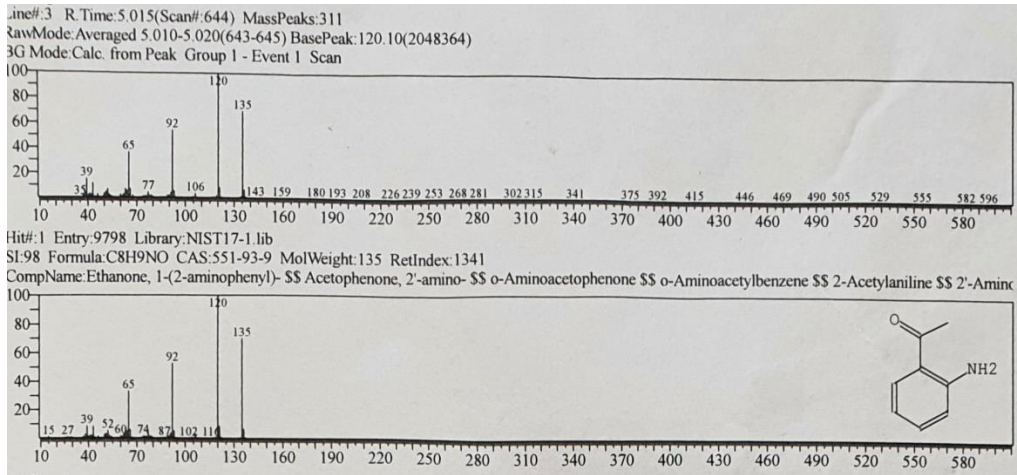


Figure S 20. MS spectra of 2-Aminoacetophenone

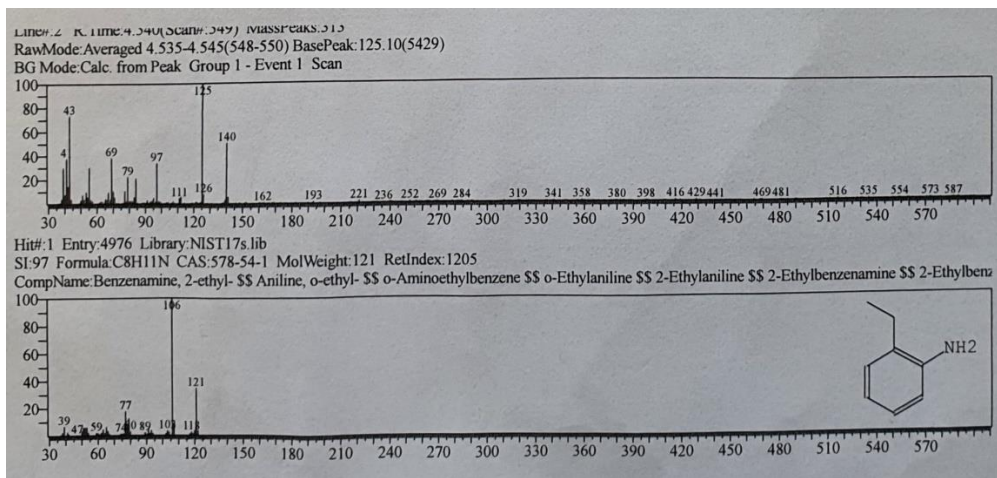


Figure S 21. MS spectra of 2-Ethylaniline

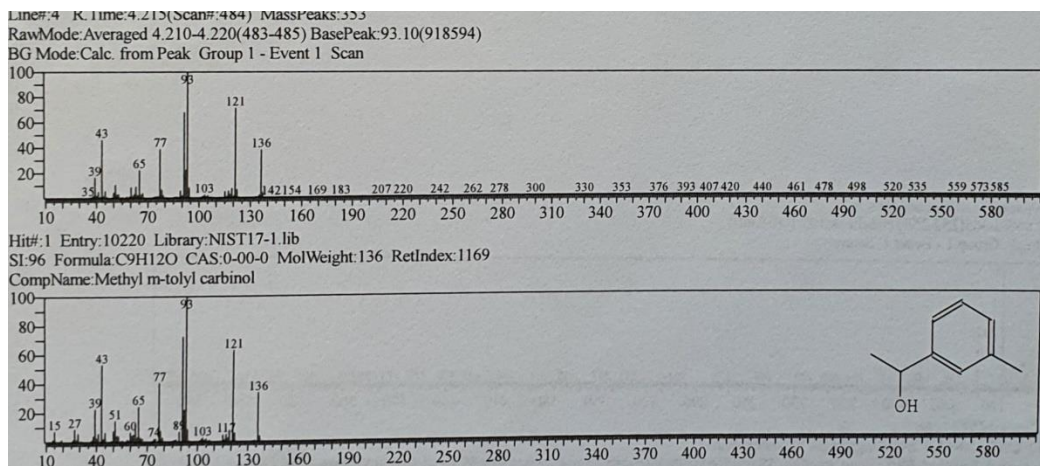


Figure S 22. MS spectra of 1-(3-Methylphenyl)ethanol

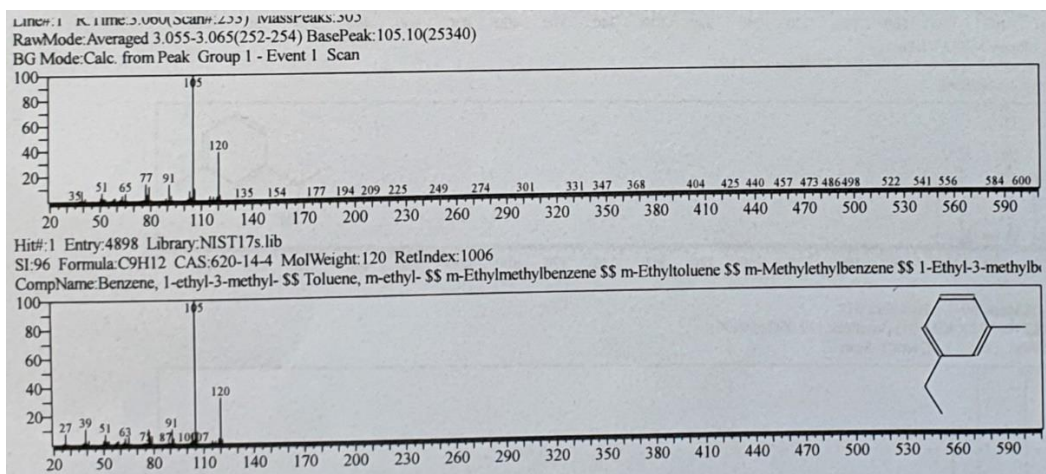


Figure S 23. MS spectra of 3-Ethyltoluene

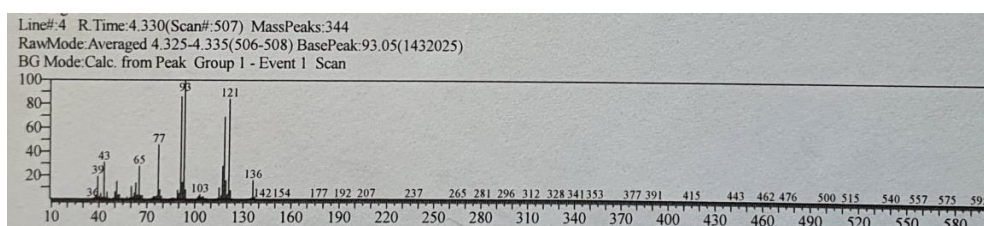


Figure S 24. MS spectra of 1-(2-Methylphenyl)ethanol

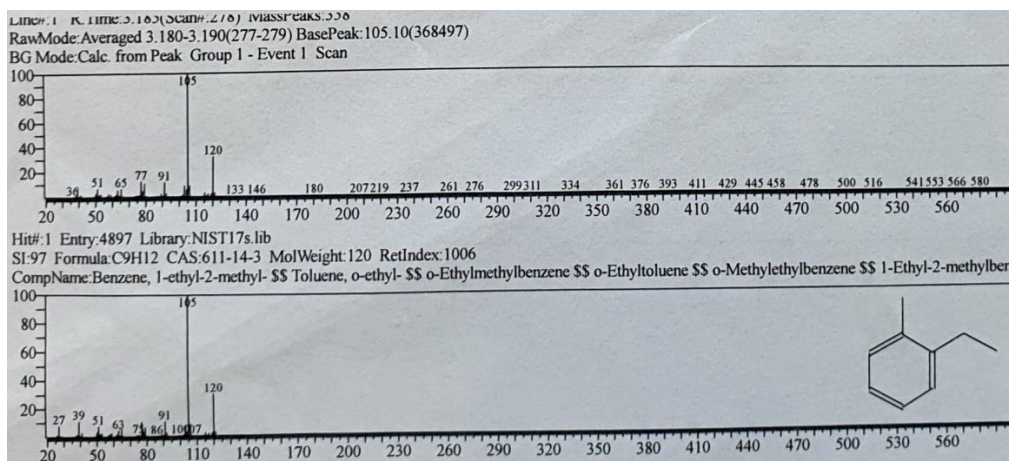


Figure S 25. MS spectra of 3-Ethyltoluene

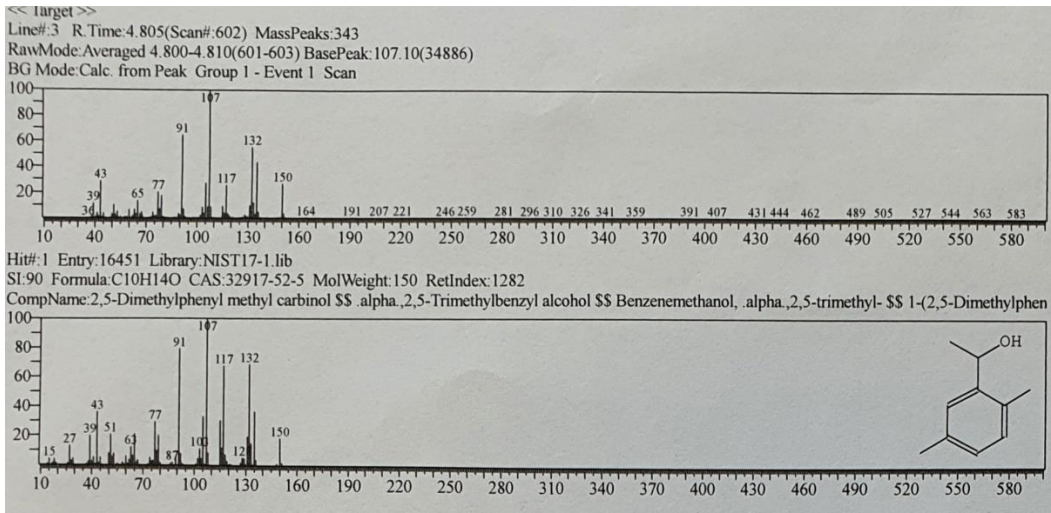


Figure S 26. MS spectra of 1-(2,5-Dimethylphenyl)ethanol

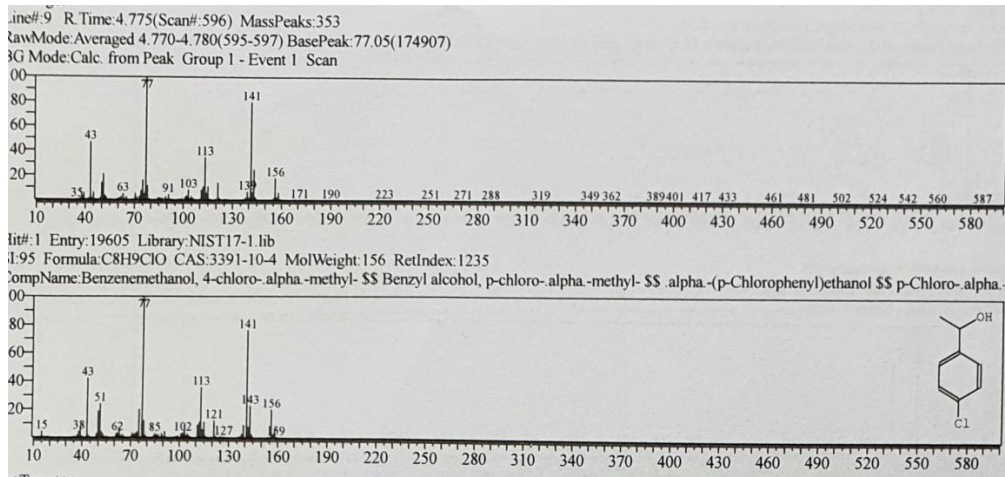


Figure S 27. MS spectra of 1-(4-Chlorophenyl)ethanol

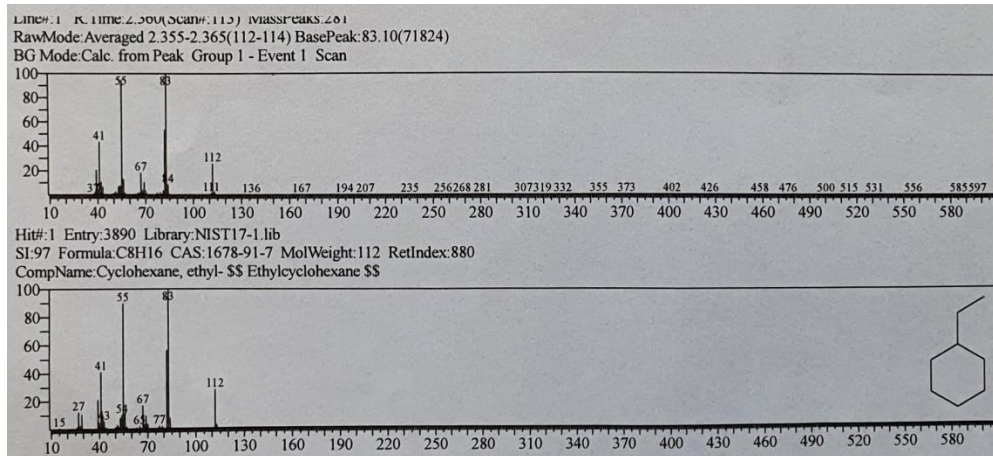


Figure S 28. MS spectra of ethylcyclohexane