

Efficient aqueous-phase hydrogenation of m-xylylenediamine to 1,3-cyclohexandimethylamine over a highly active and stable ruthenium catalyst

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The supporting information includes:

Figures S1 to S2

Table S1 to S2

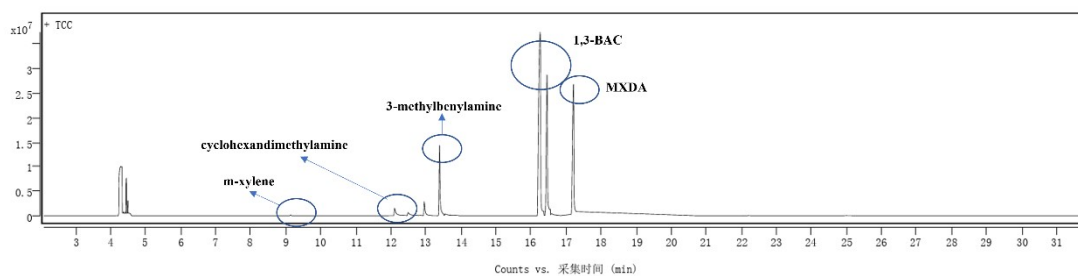
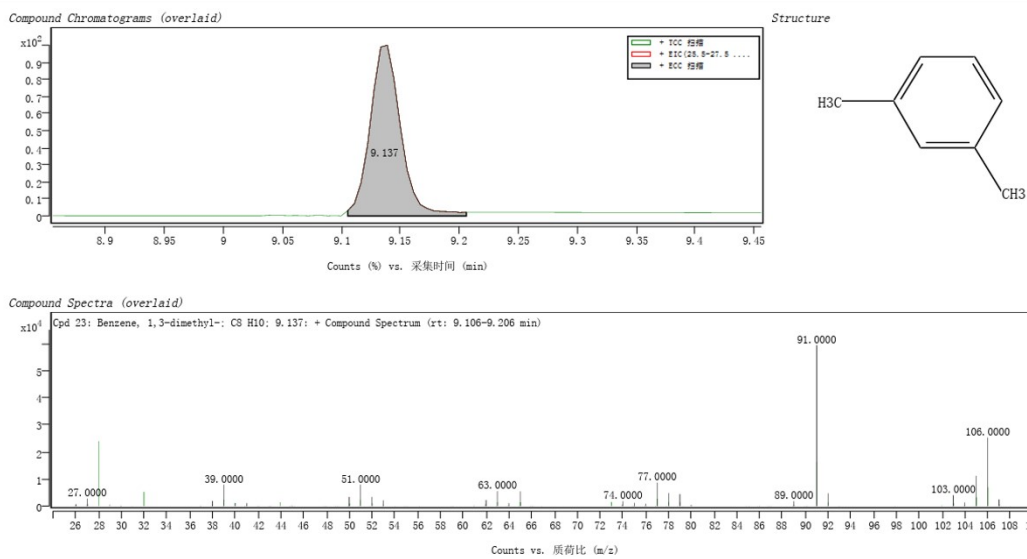
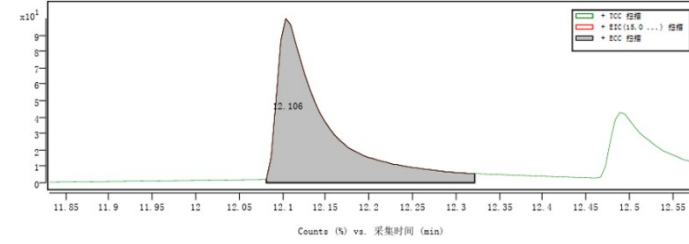


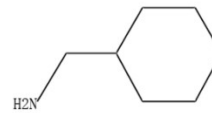
Fig. S1a Gas chromatography of the solution after hydrogenation



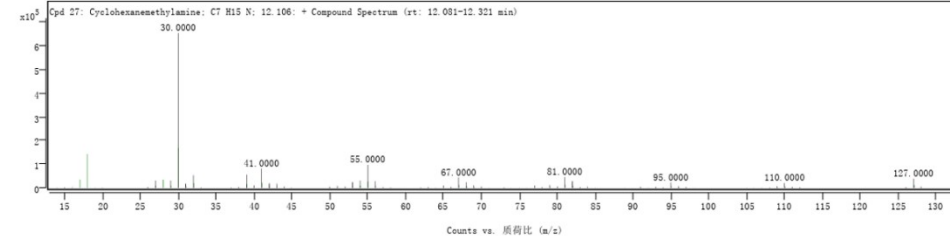
Compound Chromatograms (overlaid)



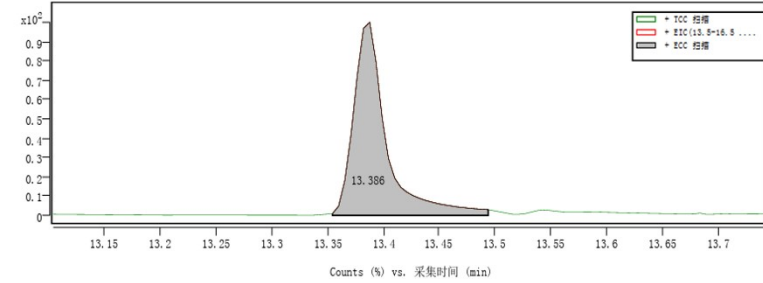
Structure



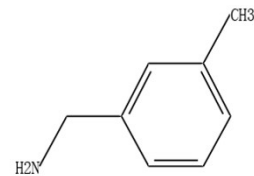
Compound Spectra (overlaid)



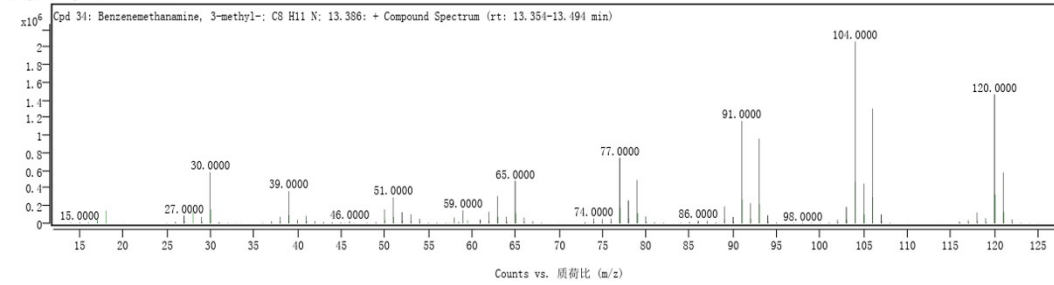
Compound Chromatograms (overlaid)



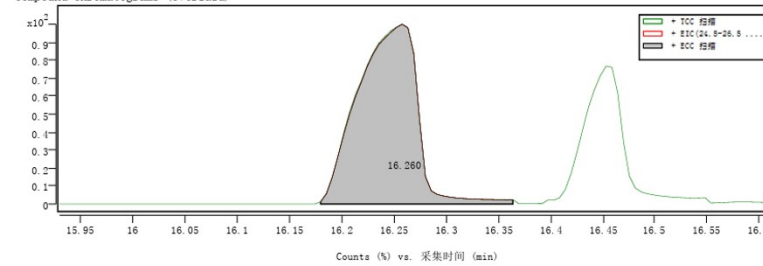
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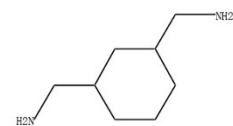
Compound Spectra (overlaid)



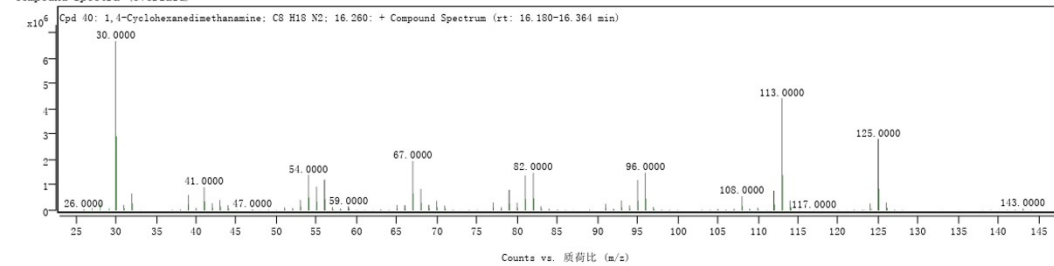
Compound Chromatograms (overlaid)



Structure



Compound Spectra (overlaid)



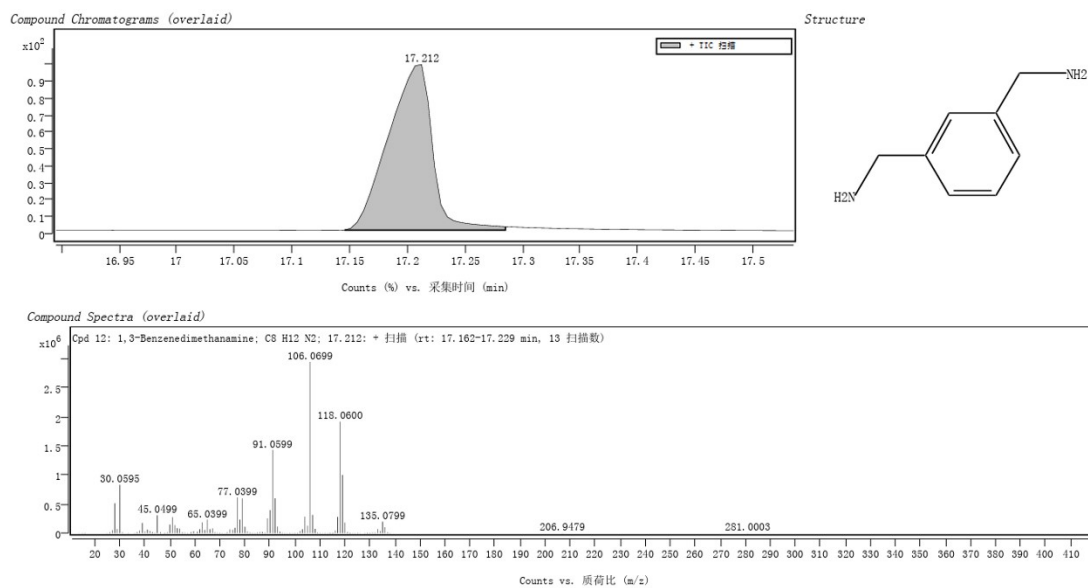


Fig. S1b Mass spectra of the detected substances in Fig. 1a

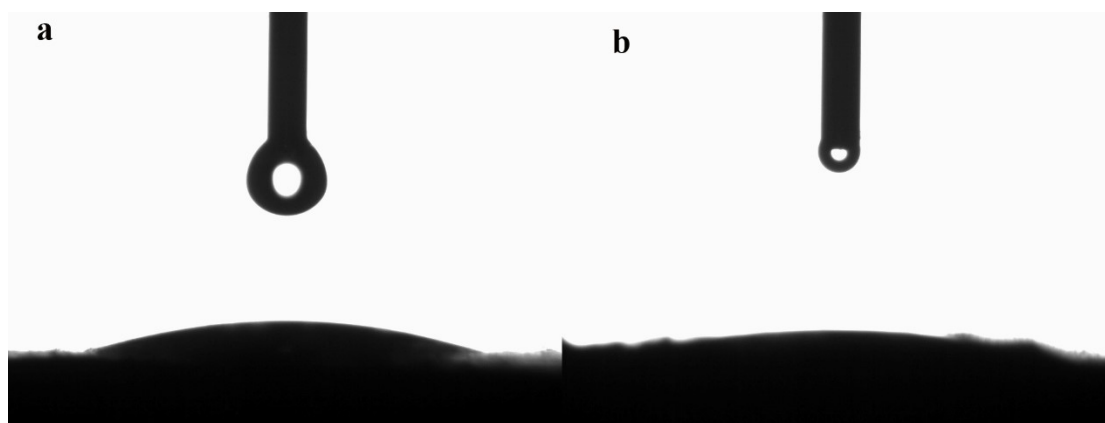


Fig. S2 Static contact Angle diagram of Ru/Al₂O₃ (a) and Ru/NH₂-Al₂O₃ (b)

Table S1 Catalytic performances of various supported Ru catalysts

Catalyst	Conversion(%)	Selectivity(%)	Yield/%
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Ru/Al ₂ O ₃	62.29	82.02	51.09
Ru/CeO ₂	36.59	77.96	28.53
Ru/MgO	20.90	83.23	17.40
Ru/ZSM-5	32.54	79.14	25.75
Ru/NH ₂ -Al ₂ O ₃	99.7	95.0	94.72
Ru/NH ₂ -USY	40.1	79.2	31.76

Reaction condition: 10.00 g of MXDA, 0.40 g of catalyst, 90.00 g of H₂O, 5 h, 4 MPa H₂, stirring speed: 800 r/min.

Table S2 Hydrogenation of MXDA to 1,3-BAC in water over catalysts with different Ru contents

Entry	Ru content (wt%)	MXDA conversion (%)	1,3-BAC selectivity (%)
1 ^a	1.52	81.8	66.9
2 ^a	2.72	93.1	67.9
3 ^a	4.31	99.9	85.7

^a Reaction conditions: reaction temperature, 120 °C; reaction pressure, 4 MPa H₂; reaction time, 5 h.