Electronic Supplementary Material (ESI) for Catalysis Science & Technology

Supporting Information

Sequential synthesis of β-amino alcohols using CeO_2-ZrO_2 bifunctional catalyst system

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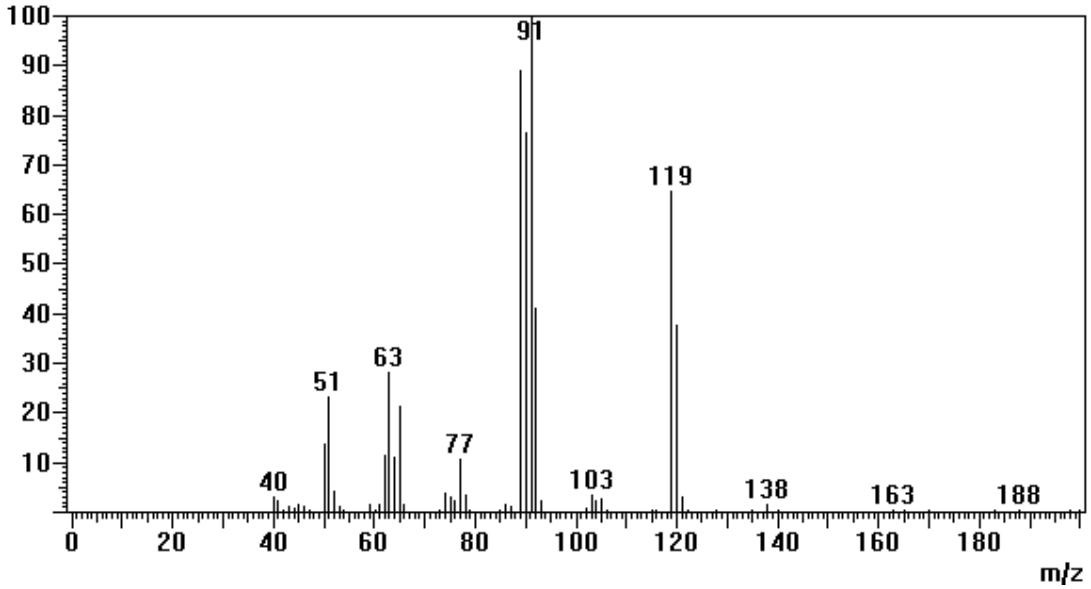
General procedure for synthesis of epoxides over CeO_2-ZrO_2

To a mixture of styrene (2mmol) and *t*-butyl hydrogen peroxide (4 mmol), 20CeO_2-ZrO_2 (20 wt %) was added in a 25 mL round bottom flask fitted to a reflux condenser. CCl_4 (3mL) used as a reaction medium was added to the reaction mixture and was heated at 80 °C for 7 h under vigorous stirring. The reaction progress was monitored by gas chromatography. After completion of the reaction, the reaction mixture was filtered to separate the catalyst. The reaction mixture was then passed through a bed of anhydrous Na_2SO_4 to remove water. All the yields were determined by GC analysis and structures were confirmed by GC-MS. ^{1}H-NMR of some selected products was determined and were in accordance with the literature reports.

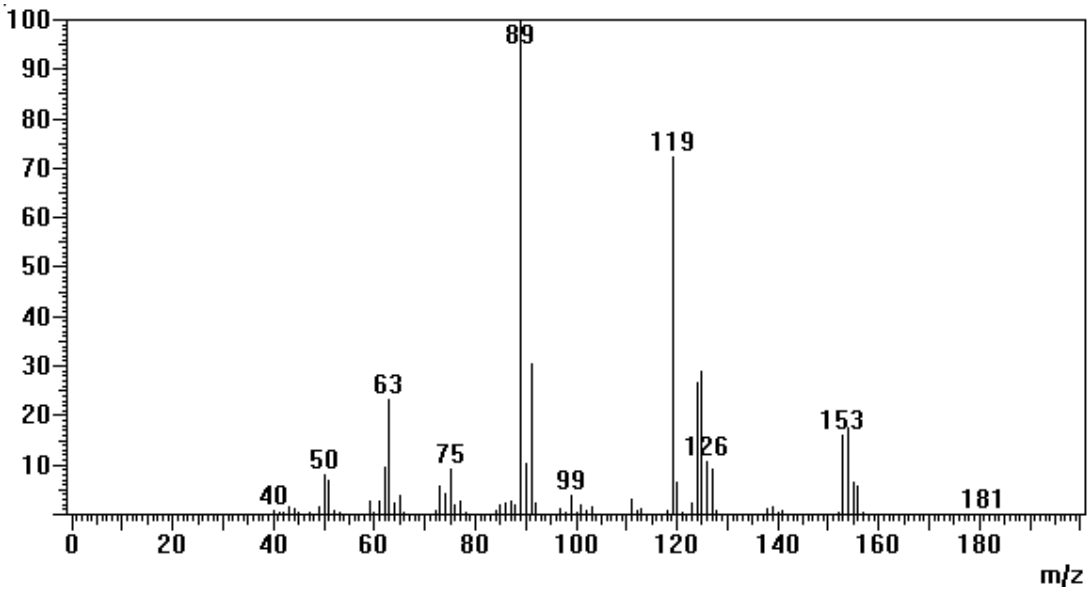
General procedure for synthesis of β-amino alcohols over CeO_2-ZrO_2

In a typical reaction, styrene oxide (2 mmol) was mixed with aniline (2.1 mmol) and 20CeO_2-ZrO_2 (20 wt %) was added in a 25 mL round bottom flask fitted to a reflux condenser. The reaction mixture was vigorously stirred at 80°C for 5 h under solvent-free conditions. The reaction progress was monitored by TLC. After completion of the reaction, ethyl acetate (2 mL) was added to the reaction mixture and catalyst was filtered. The product was isolated by column chromatography using hexane / ethyl acetate system. All the yields were determined by GC analysis and structures were further confirmed by GC-MS.

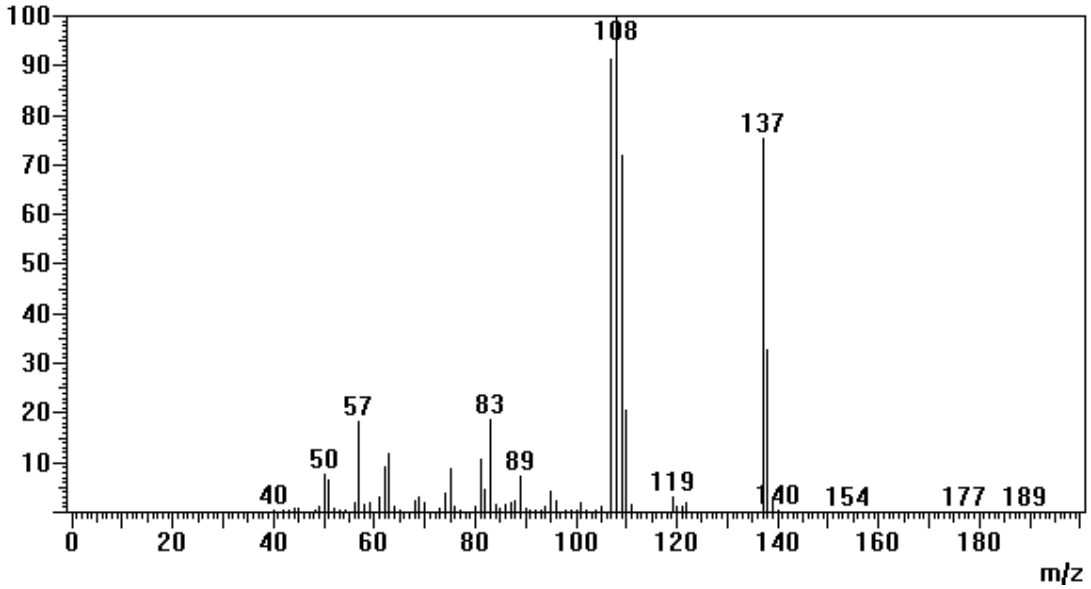
GCMS spectra of the prepared compounds:



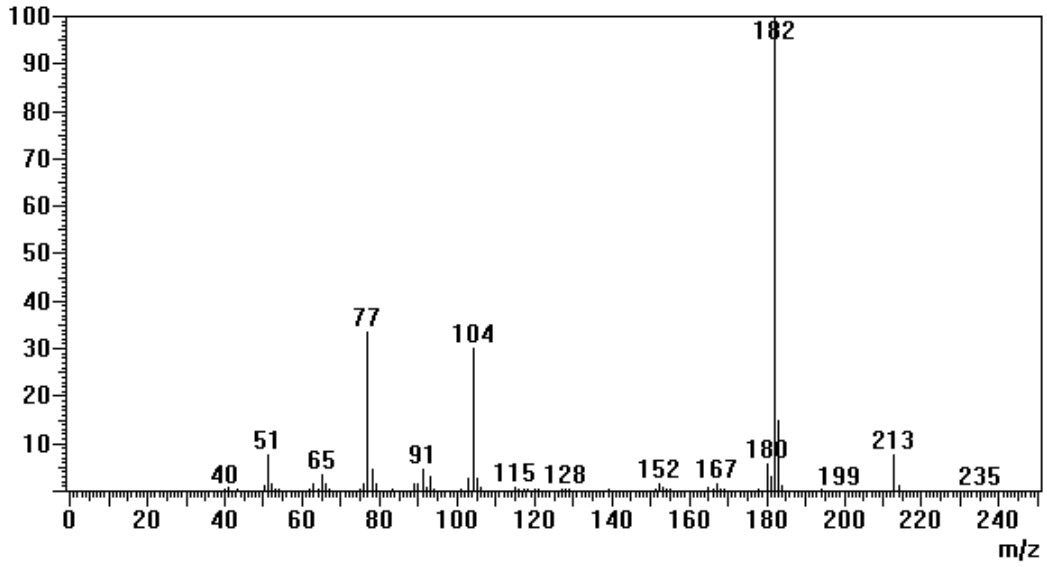
Styrene oxide (Table 5, entry 1)



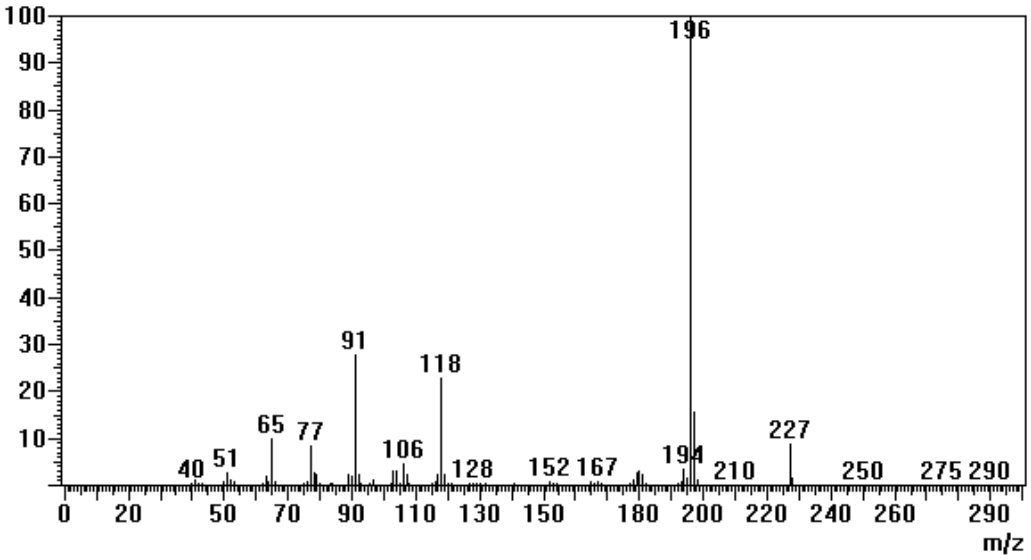
2-chloro styrene oxide (Table 5, entry 4)



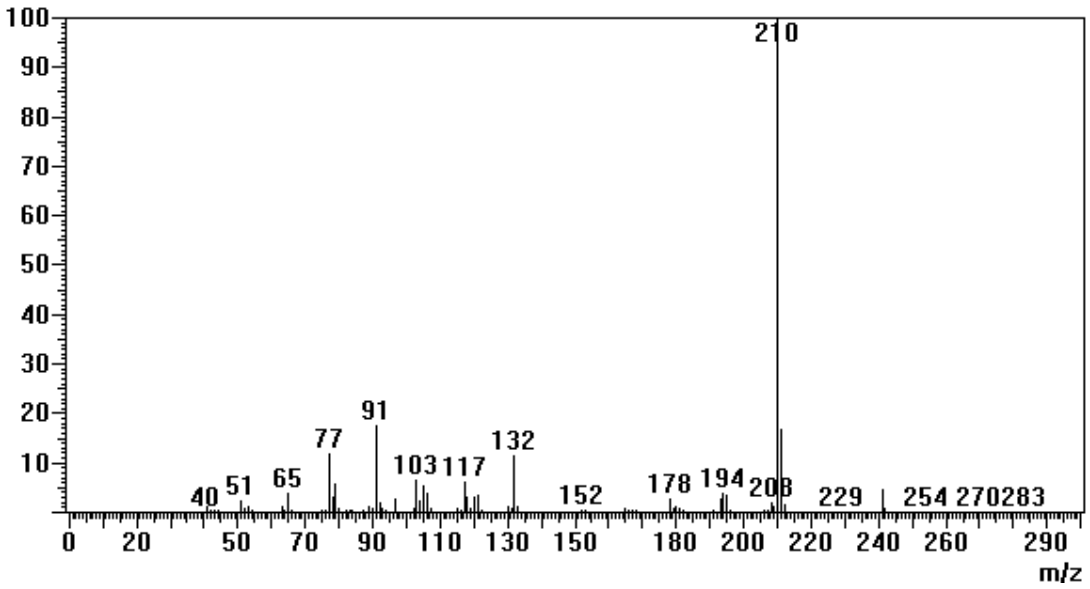
4-fluoro styrene oxide (Table 5, entry 6)



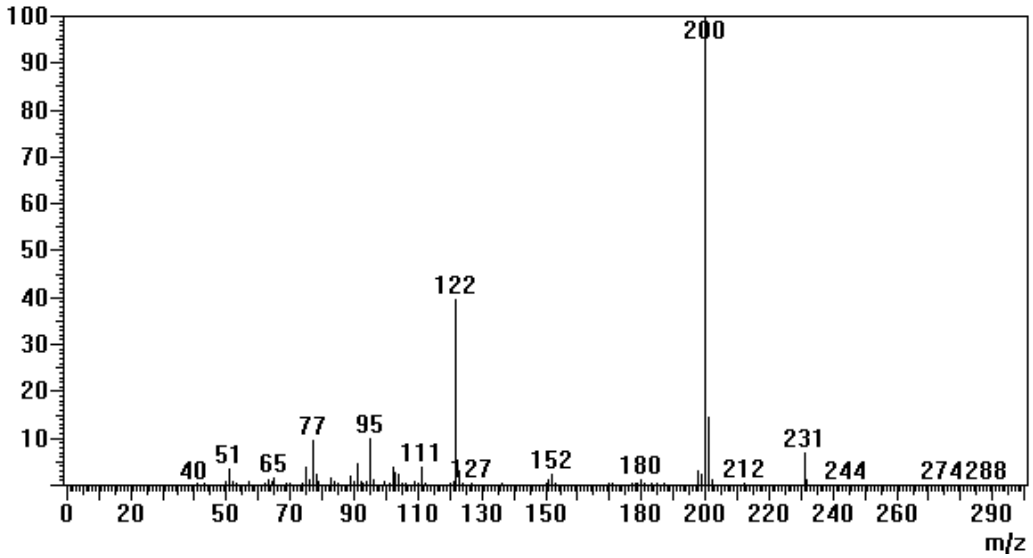
2-(phenylamino)-2-phenylethanol (Table 6, entry 1)



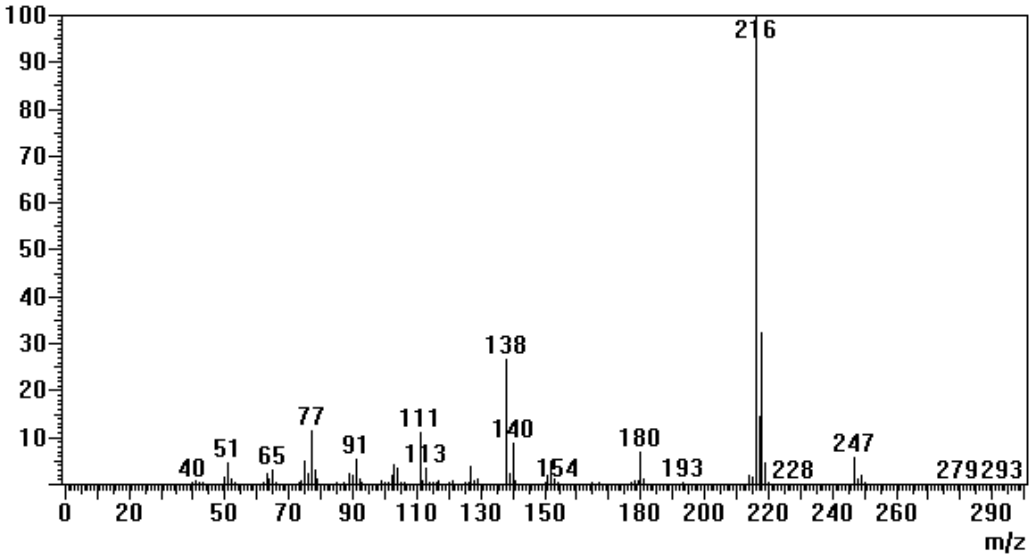
2-(4-methylphenylamino)-2-phenylethanol (Table 6, entry 2)



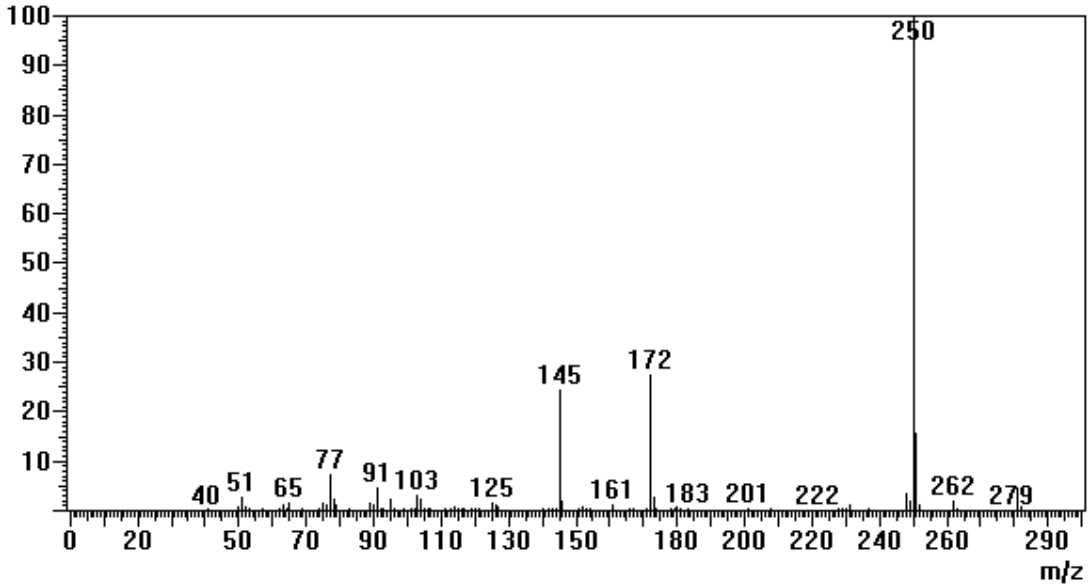
2-(2,6-dimethylphenylamino)-2-phenylethanol (Table 6, entry 3)



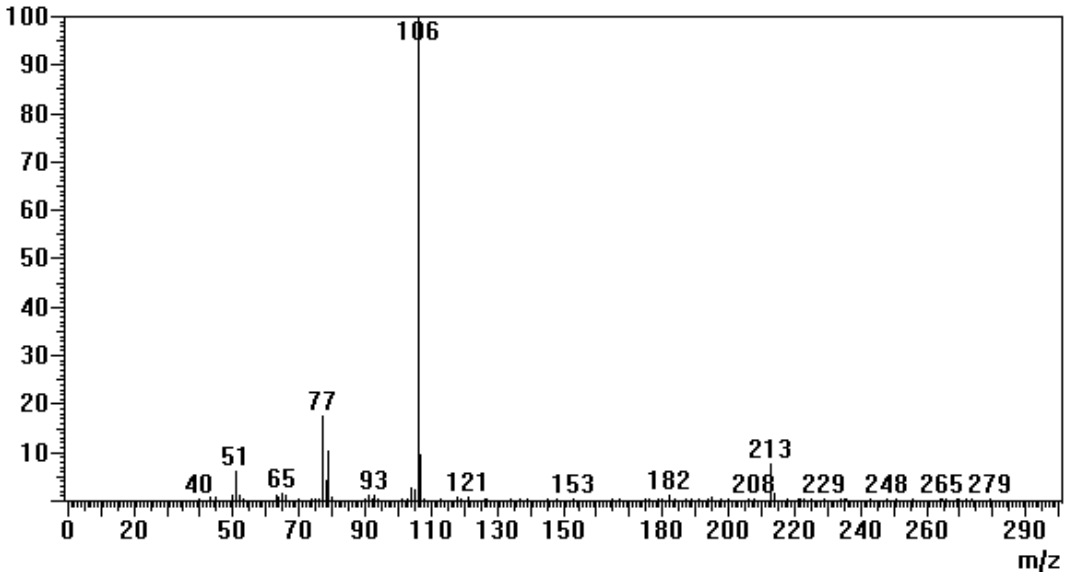
2-(2-fluorophenylamino)-2-phenylethanol (Table 6, entry 5)



2-(4-chlorophenylamino)-2-phenylethanol (Table 6, entry 6)



2-(3-trifluoromethylphenylamino)-2-phenylethanol (Table 6, entry 7)



2-(phenylamino)-1-phenylethanol (Scheme 3, B)