Electronic Supplementary Material (ESI) for RSC Advances.

Highly efficient continuous-flow oxidative coupling of amines using promising nanoscale CeO_2-M/SiO_2 (M = MoO_3 and WO_3) solid acid catalysts

Bolla Govinda Rao[a],Putla Sudarsanam[b], Baithy Mallesham[a], Benjaram M. Reddy[a,*]

[a]*Inorganic and Physical Chemistry Division, CSIR – Indian Institute of Chemical Technology Uppal Road, Hyderabad – 500 007, India*

[b]*Centre for Advanced Materials and Industrial Chemistry (CAMIC), School of Sciences RMIT University, Melbourne VIC 3001, Australia*

*****Author to whom correspondence should be addressed. Phone: +91 40 2719 3510. Fax: +91 40 2716 0921. E–mail: bmreddy@iict.res.in; mreddyb@yahoo.com

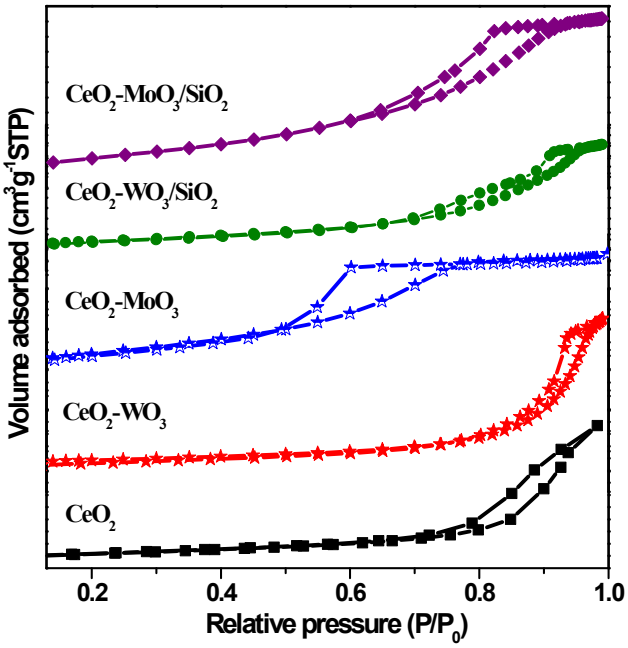


Fig.S1 N_2 adsorption–desorption isotherms of CeO_2, CeO_2-WO_3, CeO_2-MoO_3, CeO_2-WO_3/SiO_2 and CeO_2-MoO_3/SiO_2 catalysts.

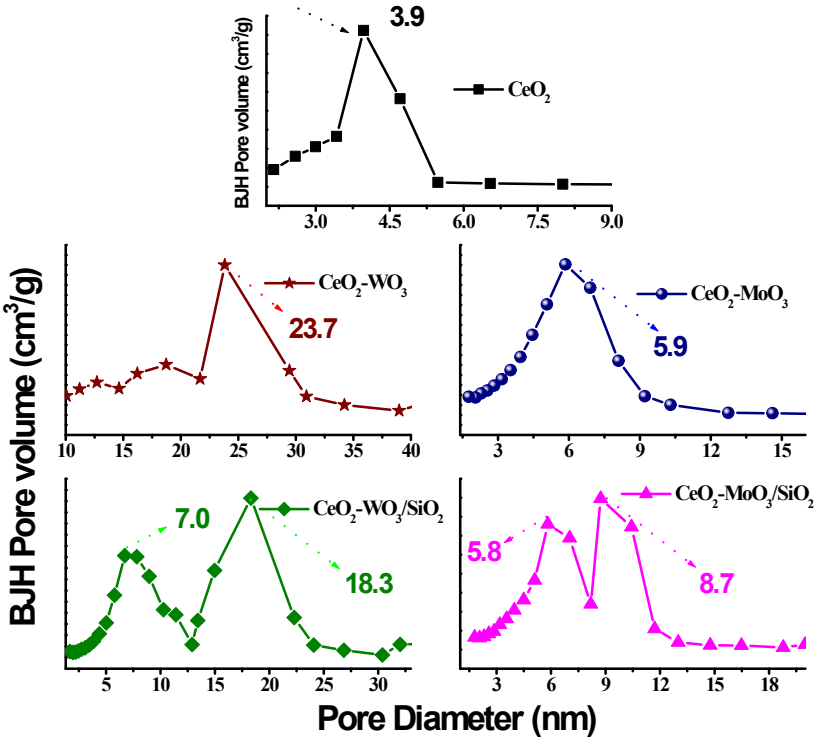


Fig.S2 Pore size distribution profiles of CeO_2, CeO_2-WO_3, CeO_2-MoO_3, CeO_2-WO_3/SiO_2 and CeO_2-MoO_3/SiO_2 samples.

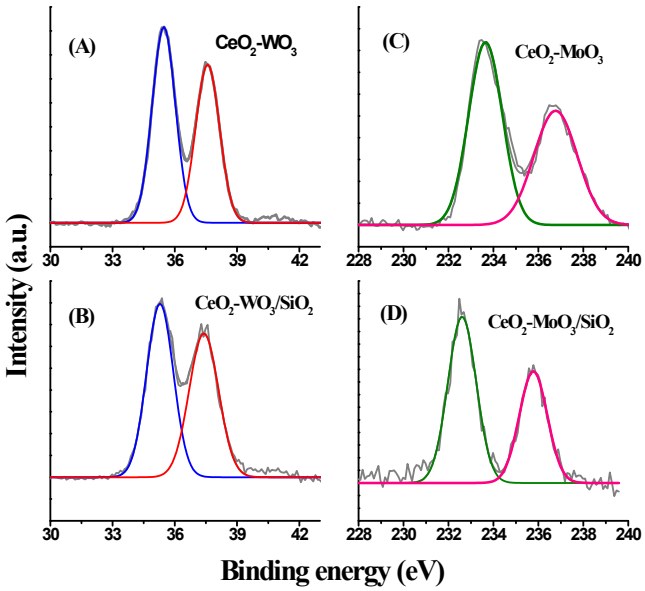


Fig. S3 (A-B) W 4f core level XP spectra of CeO_2-WO_3 and CeO_2-WO_3/SiO_2 catalysts and (C-D) Mo 3d core level XP spectra of CeO_2-MoO_3 and CeO_2- MoO_3/SiO_2 catalysts.

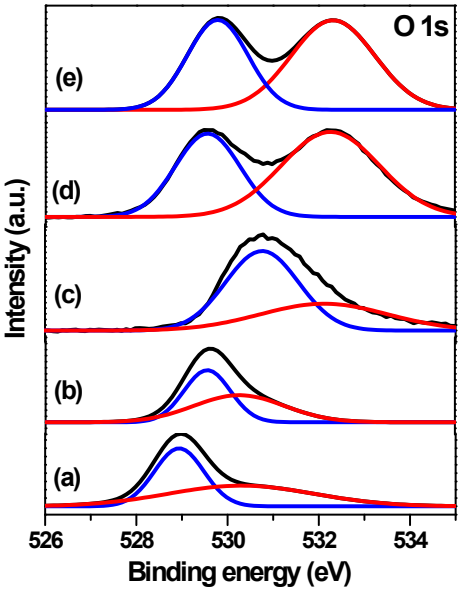


Fig. S4 The O 1s core level XP spectra of (a) CeO_2, (b) CeO_2-WO_3, (c) CeO_2-MoO_3, (d) CeO_2-WO_3/SiO_2 and (e) CeO_2-MoO_3/SiO_2 catalysts.

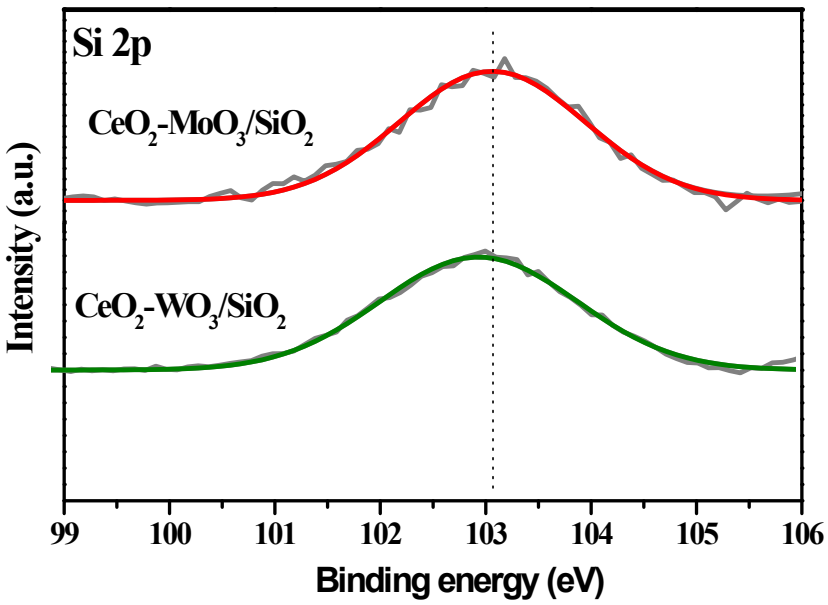


Fig. S5 The Si 2p XP spectra of CeO_2-WO_3/SiO_2 and CeO_2-MoO_3/SiO_2 samples.

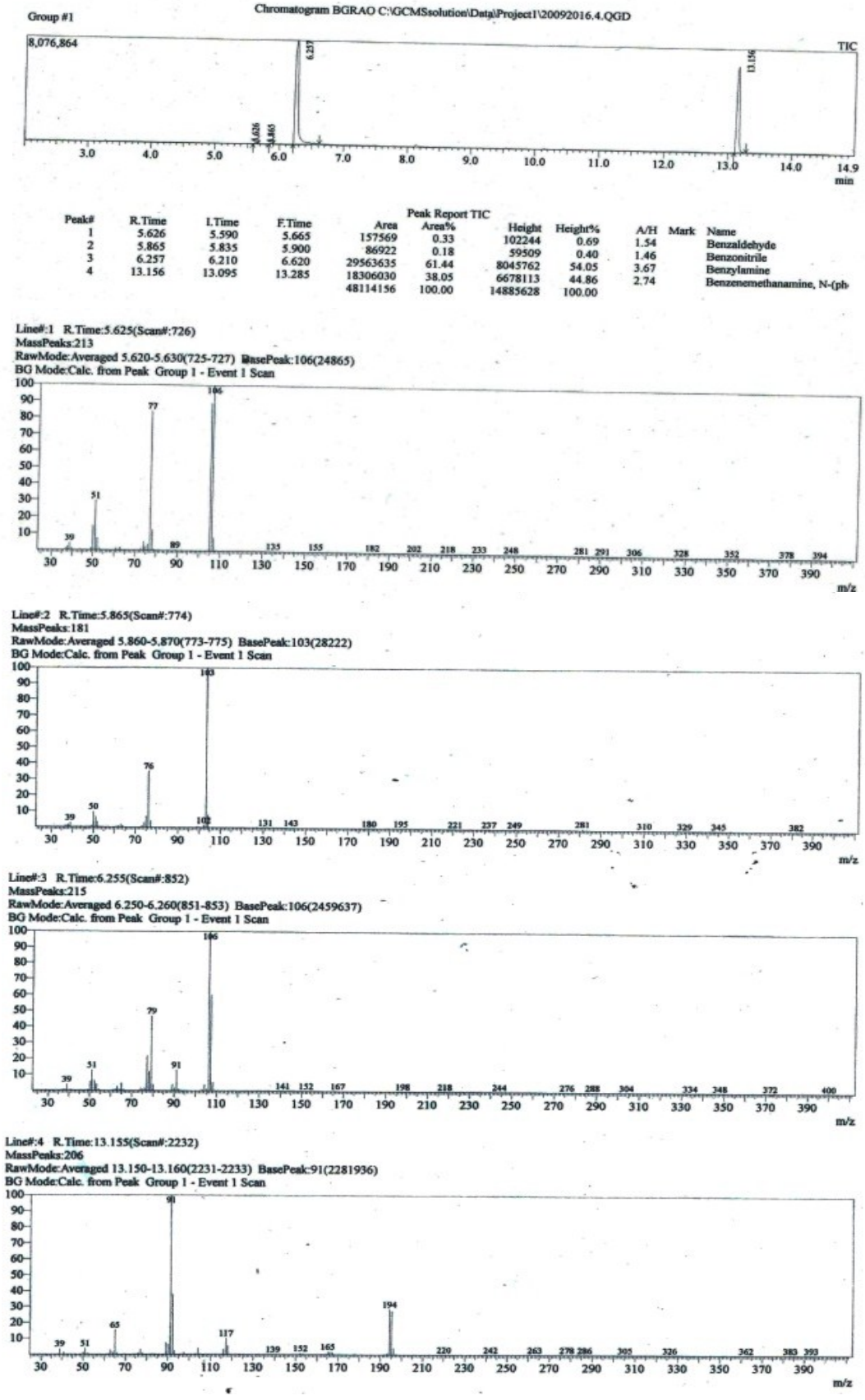
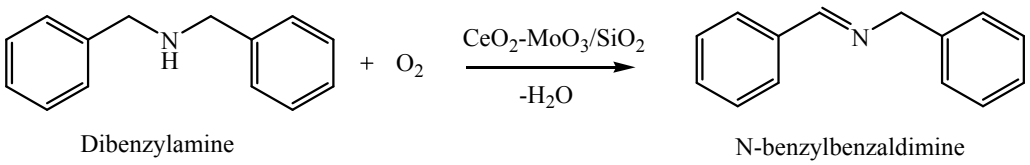


Fig. S6 GC-MS data of the reaction products.



Dibenzylamine N-benzylbenzaldimine

Fig. S7 Continuous-flow oxidation of dibenzylamine using CeO_2-MoO_3/SiO_2 solid acid catalyst.