Electronic Supplementary Material

Selective hydrodeoxygenation of guaiacol to cyclohexanol using activated hydrochar-supported Ru catalysts

Kaile Li[1], Shijie Yu (✉)[2], Qinghai Li[1], Yanguo Zhang[1], Hui Zhou (✉)[1]

1 Key Laboratory for Thermal Science and Power Engineering of Ministry of Education, Beijing Key Laboratory of CO_2 Utilization and Reduction Technology, Department of Energy and Power Engineering, Tsinghua University, Beijing 100084, China

2 Department of Chemical and Biomolecular Engineering, National University of Singapore, Singapore, Engineering Drive 4, 117585, Singapore

E-mails: yusj@nus.edu.sg (Yu S) huizhou@tsinghua.edu.cn (Zhou H)

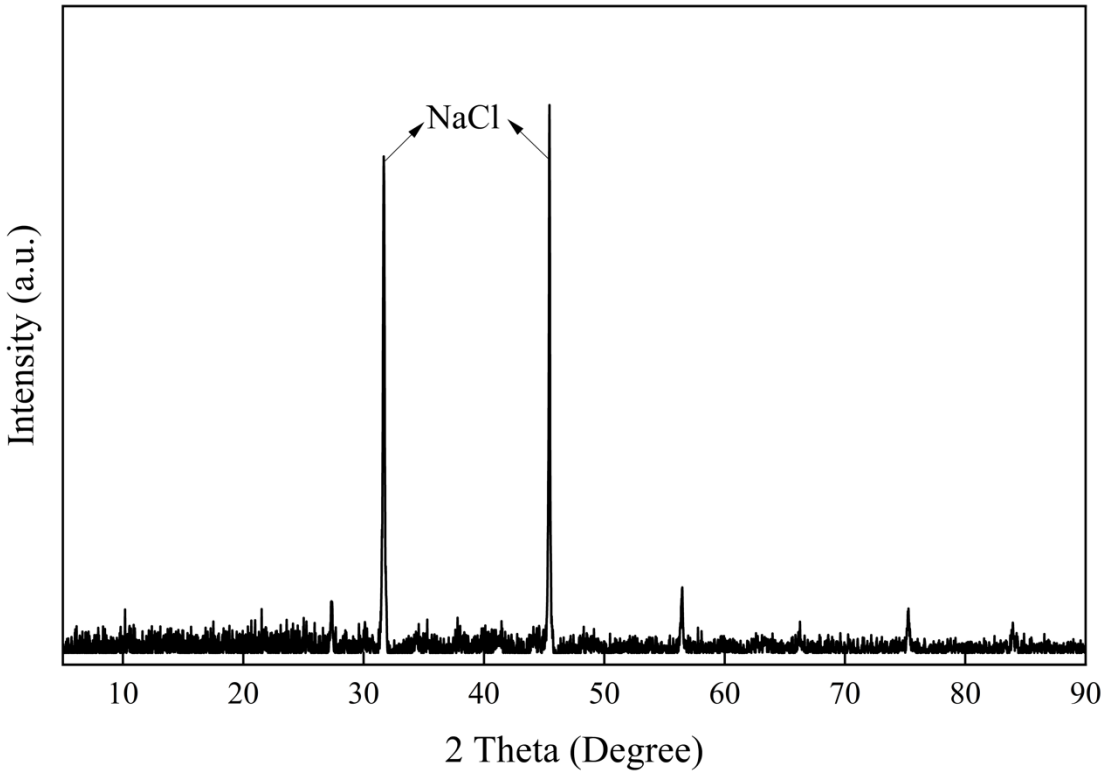

Fig. S1 XRD patterns of Ru/AHC catalyst.

During the activation process, the employment of NaOH introduced sodium ions into the system. Even after thorough washing with distilled water and ethanol, traces of NaOH might not have been completely eliminated. This residual NaOH could react with $RuCl_3$, leading to the formation of sodium chloride (NaCl).

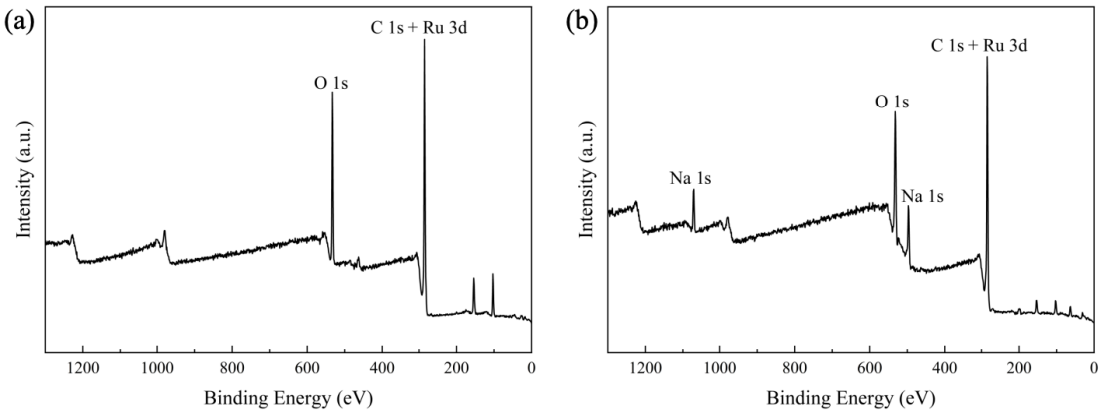

Fig. S2 XPS survey spectrum of (a)Ru/HC and (b)Ru/AHC catalyst.

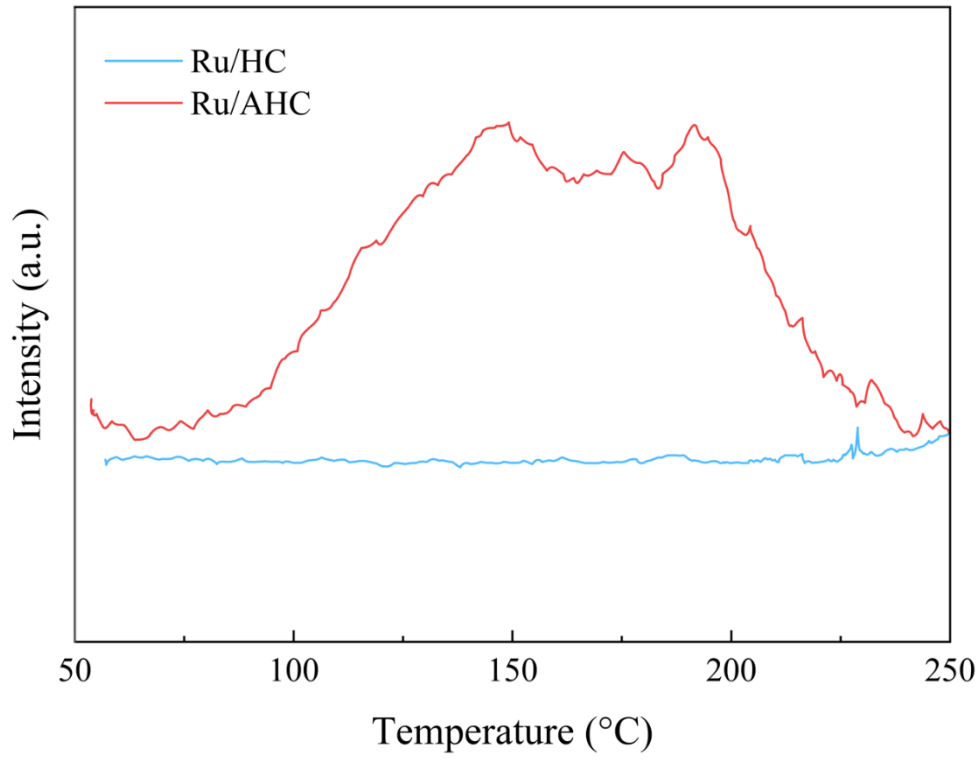

Fig. S3 CO_2-TPD profiles of Ru/HC and Ru/AHC catalysts.

Table S1 The chemical composition of Ru-species obtained from XPS analysis.

Entry	Catalyst	Area proportion of Ru (0)	Area proportion of Ru^{4+}	R(0)/Ru^{4+}
1	Ru/HC	21.88%	78.12%	0.28
2	Ru/AHC	61.12%	38.88%	1.57