

Electronic Supplementary Information

Well-ordered Cs-Ru/@SBA-15 nanocomposite materials for low pressure ammonia synthesis

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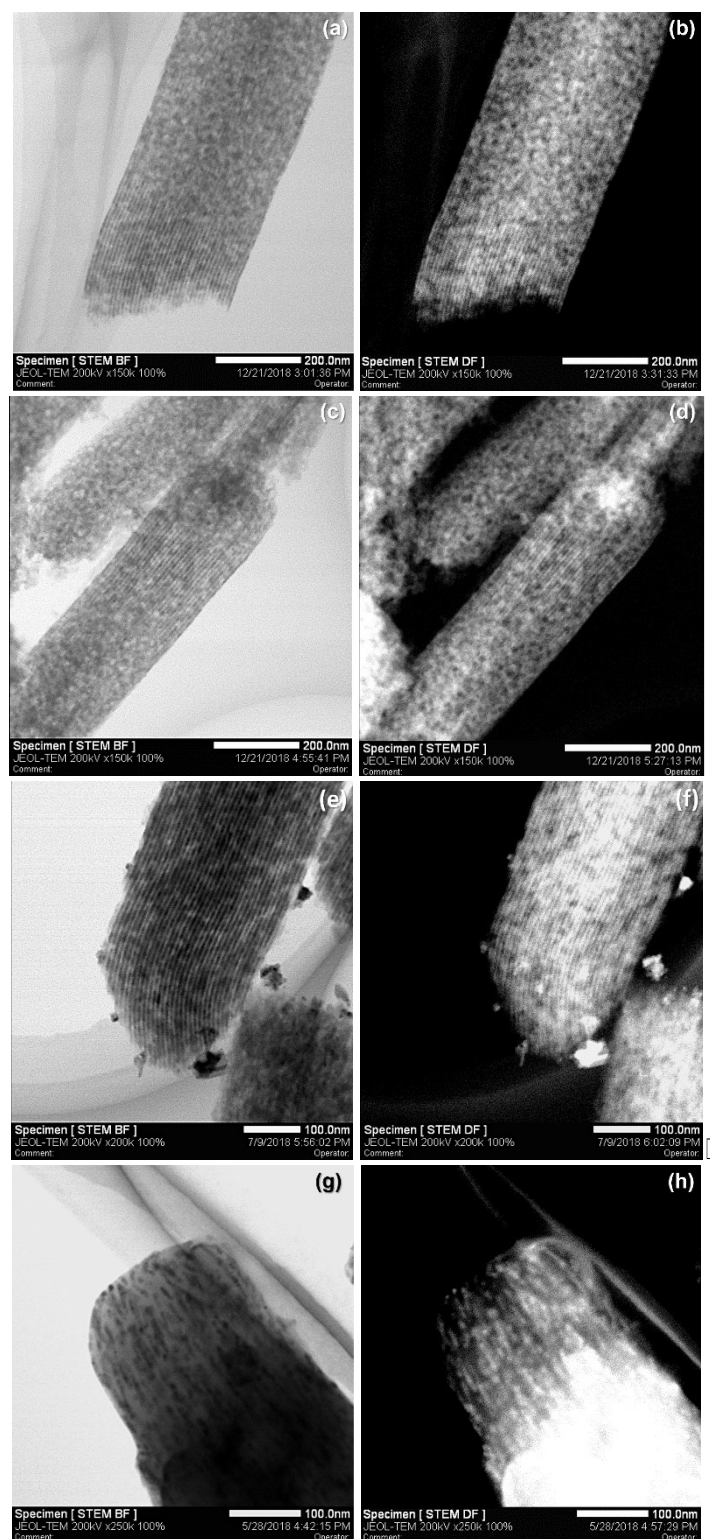


Figure S1. STEM images of prepared Cs-Ru materials: (a,b) 20Cs-6Ru/@SBA-15 and (c,d) 27Cs-8Ru/@SBA-15, (e,f) 6.6Cs-2.5Ru/C-SBA-15 and (g,h) 33Cs-10Ru/C-SBA-15.

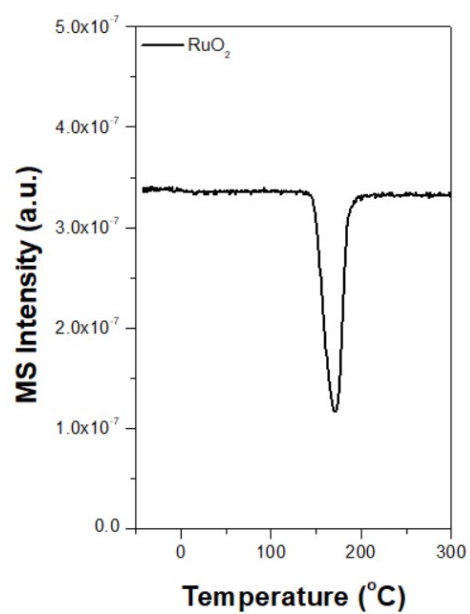


Figure S2. H₂-TPR-MS profile of commercial RuO₂ recorded by a m/z ratio of 2.

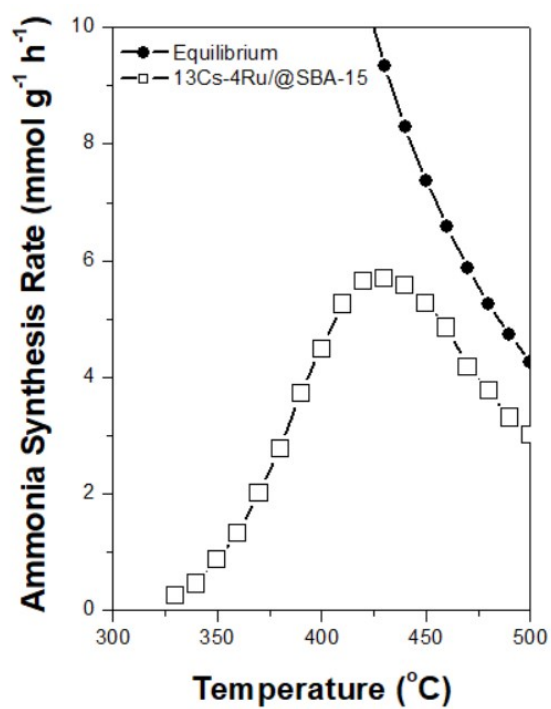


Figure S3. Ammonia synthesis over the 13Cs-4Ru/@SBA-15 catalyst at 0.9 MPa using a H₂/N₂ molar ratio of 0.2 and a total flow rate of 108 mL min⁻¹, corresponding to a SV value of 9000 h⁻¹.

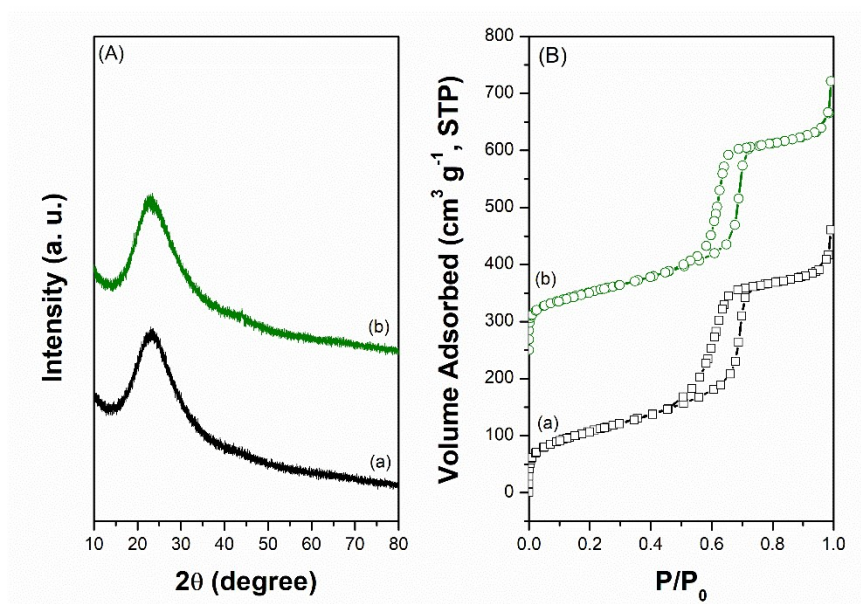


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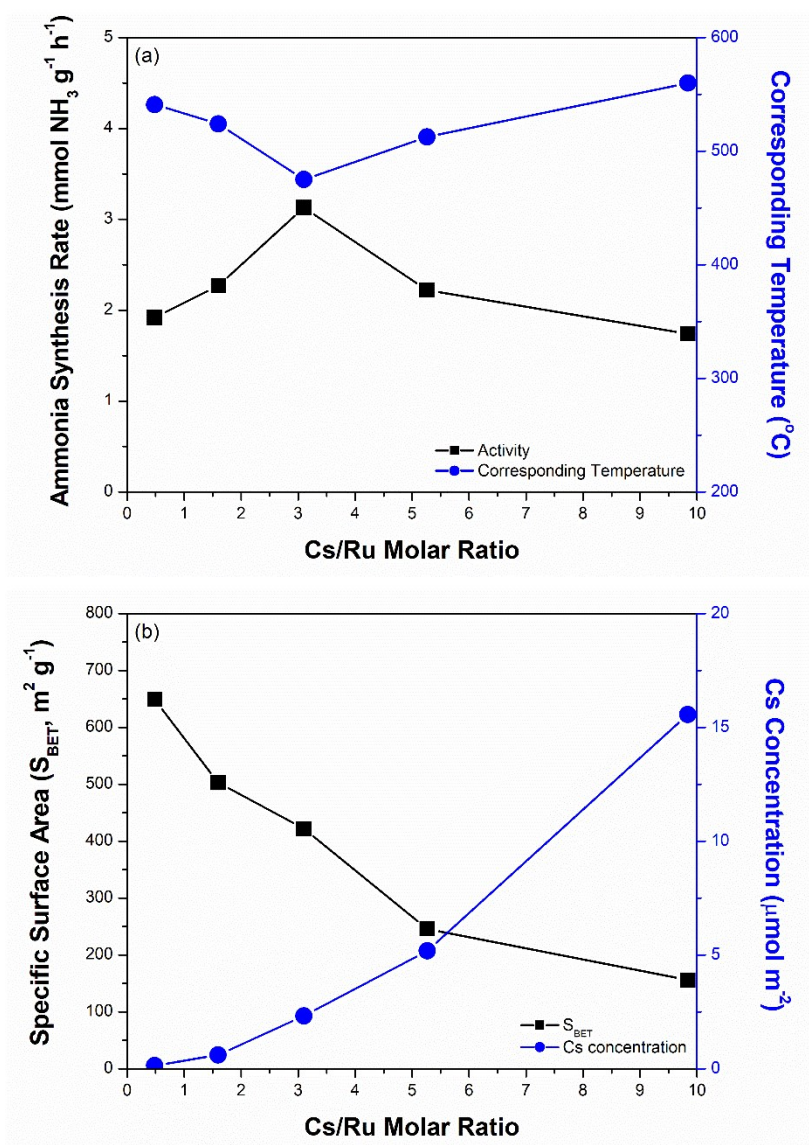


Figure S5. Effects of Cs/Ru molar ratio on (a) the ammonia synthesis activity and corresponding temperature, and (b) specific BET area and surface Cs concentration of prepared 13Cs-4Ru/@SBA-15 catalyst. In Fig. S5(a), the G1 grade standard gases of H_2 and N_2 ($\text{H}_2/\text{N}_2 = 3$) with a total flow rate of 30 mL min^{-1} were used, corresponding to an SV value of 3740 h^{-1} . The reaction pressure was kept at 0.1 MPa (atmospheric pressure).

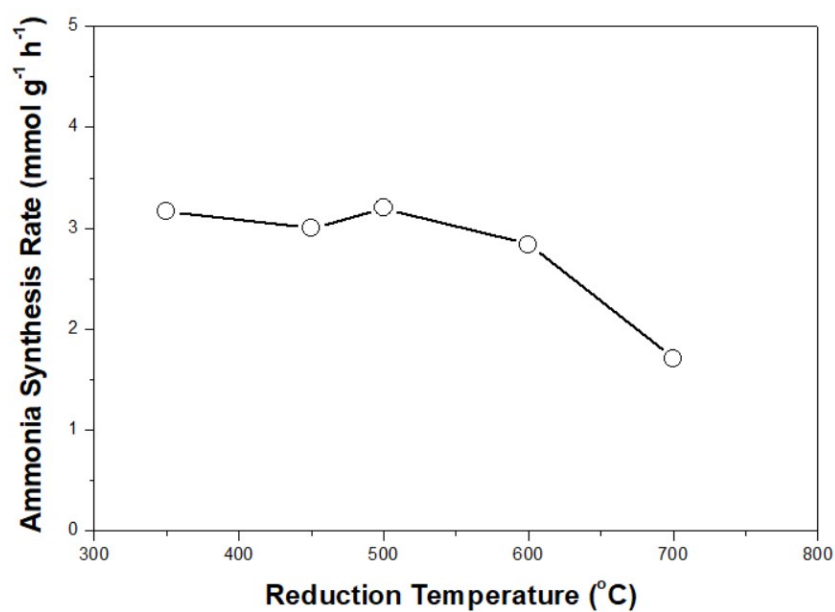


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