

Supplementary Materials

Autothermal reforming of acetic acid to hydrogen and syngas on Ni and Rh catalysts

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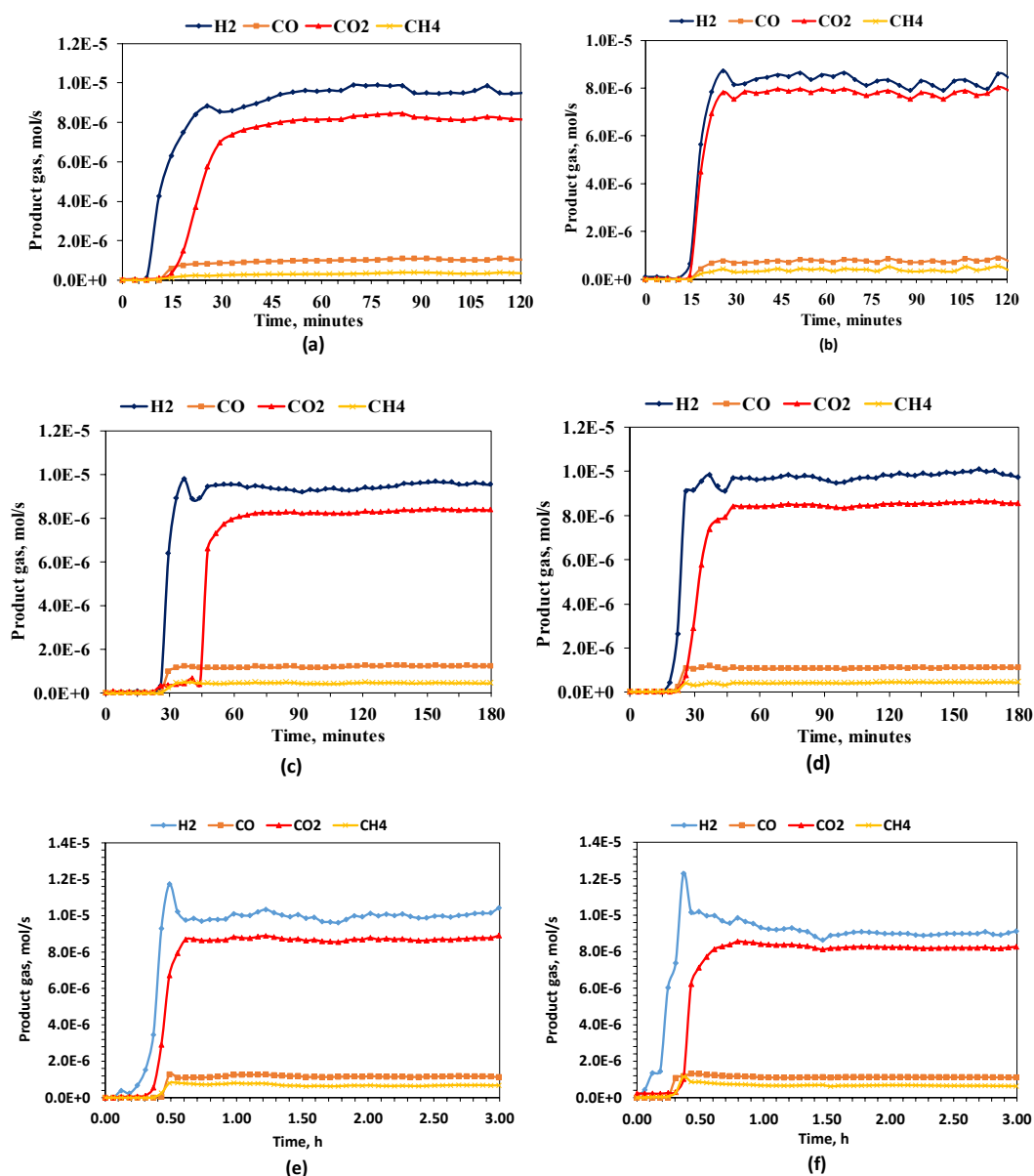
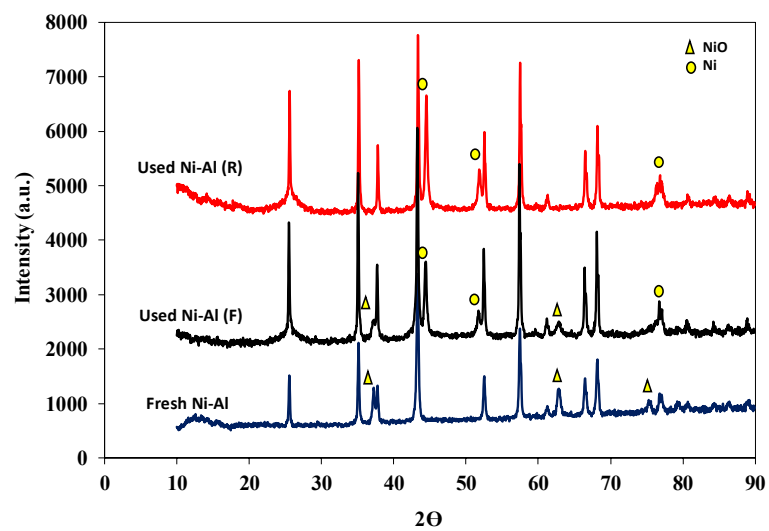
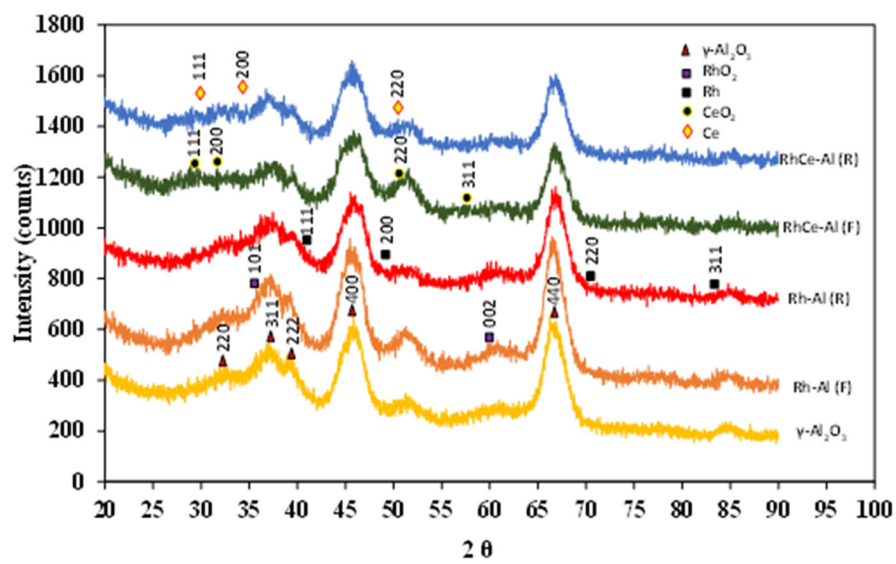


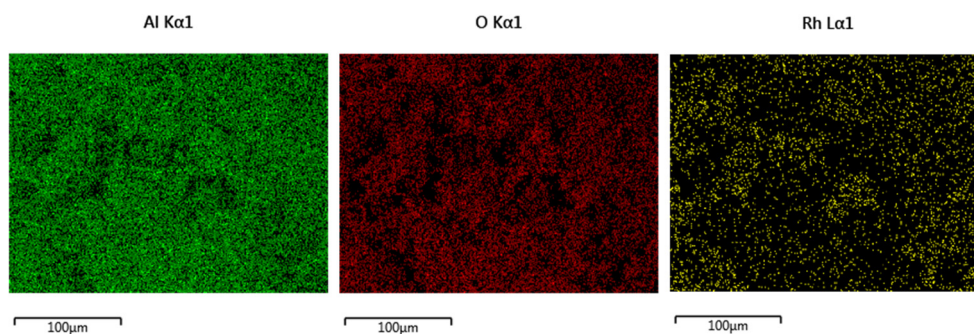
Figure 1. Dry N₂-free product gas flow composition with time on stream obtained during ATR of acetic acid flowing at 1 ml/h, S/C = 2, $\lambda = 0.353$ (Air flow = 22 ml/min), hot product gas at 570 °C and 1 bar. (a) Fresh Ni-Al. (b) Reduced Ni-Al. (c) Fresh Ni-CaAl. (d) Reduced Ni-CaAl, (e) Fresh Rh-Al, (f) Reduced Rh-Al.



(a)



(b)



(c)

Figure S2 XRD patterns of (a) unused fresh Ni-Al, used Ni-Al (used Ni-Al (F)) and used reduced Ni-Al (used Ni-Al (R)). Unlabelled peaks belong to the α -Al₂O₃ support, Ni-CaAl XRD are not shown due to large amorphous content (b) Rh-Al fresh (F) in orange and reduced Rh-Al (F) catalyst in red compared to the rhodium-free γ -Al₂O₃ support in yellow. (c) Elemental mapping of Rh-Al showing good dispersion of Rh.

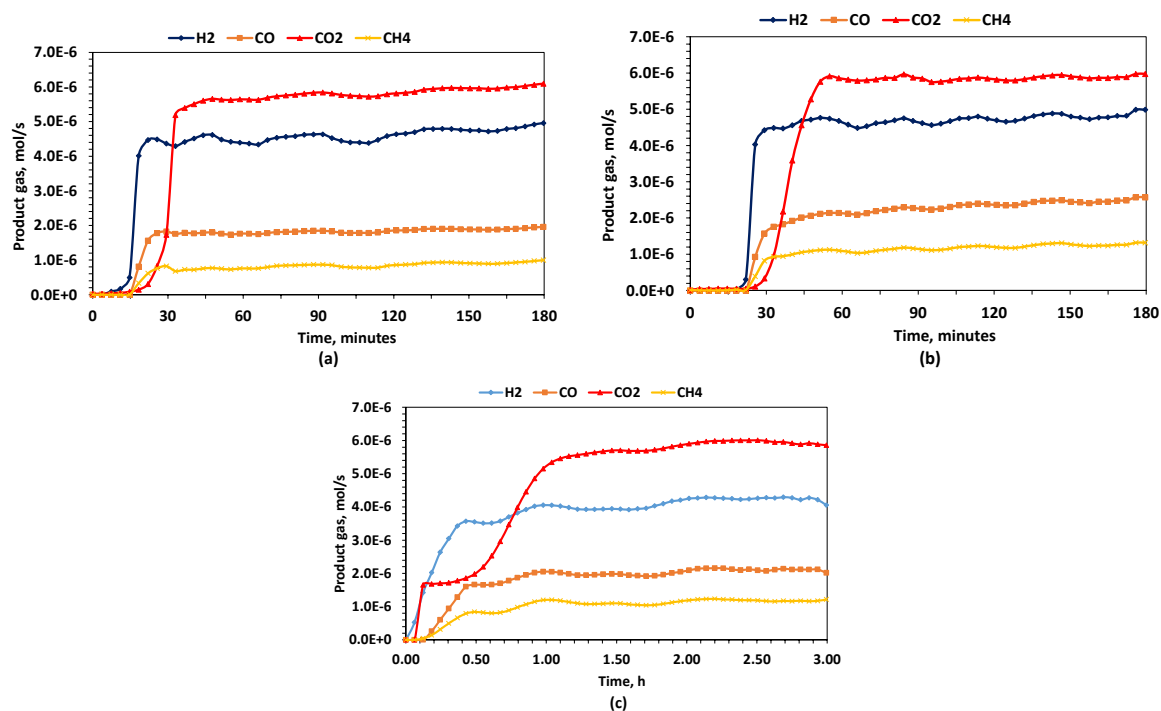


Figure S3 a-c Dry N₂-free molar flow product gas profiles with time on stream obtained for POX of acetic acid flowing at 1 ml/h, $\lambda = 0.353$ (Air flow = 22 ml/min), 570 °C and 1 bar. (a) Fresh Ni-Al (b) Fresh Ni-CaAl, (c) Fresh Rh-Al.

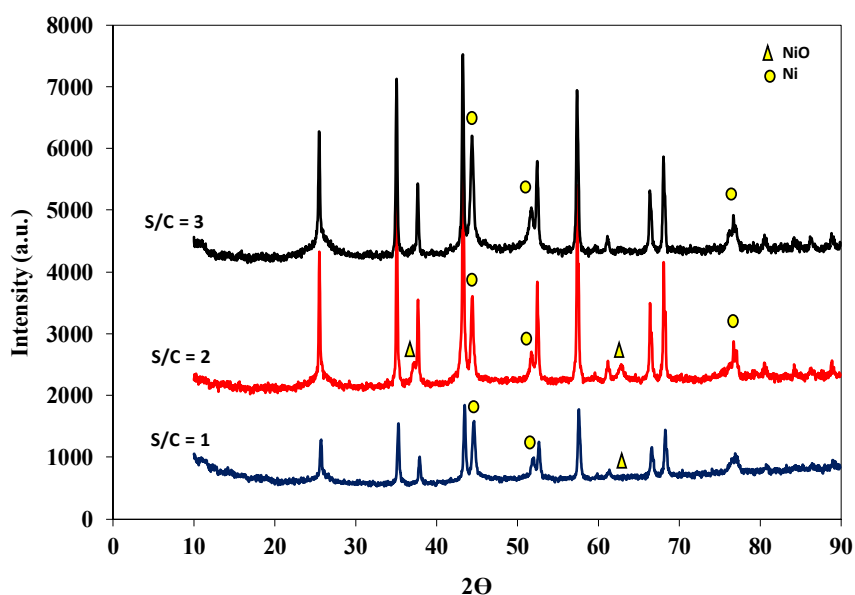


Figure S4 XRD patterns of Ni-Al catalyst for experiments performed using fresh catalyst at S/C 1, 2 and 3 and 1 bar. Acetic acid flow, 1 ml/h, with corresponding λ and temperature values of (0.340, 610 °C), (0.353, 570 °C) and (0.374, 545 °C). All unlabelled peaks belong to the α -Al₂O₃ support.

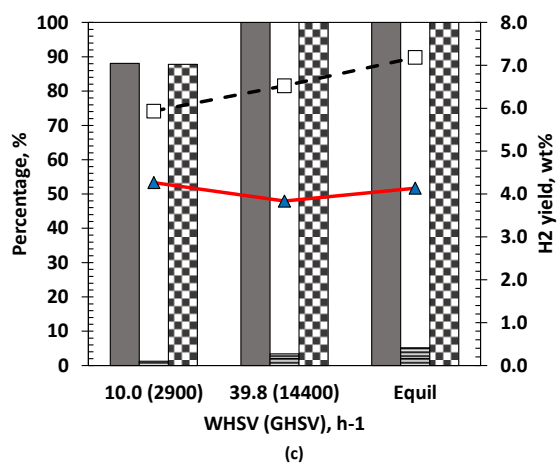
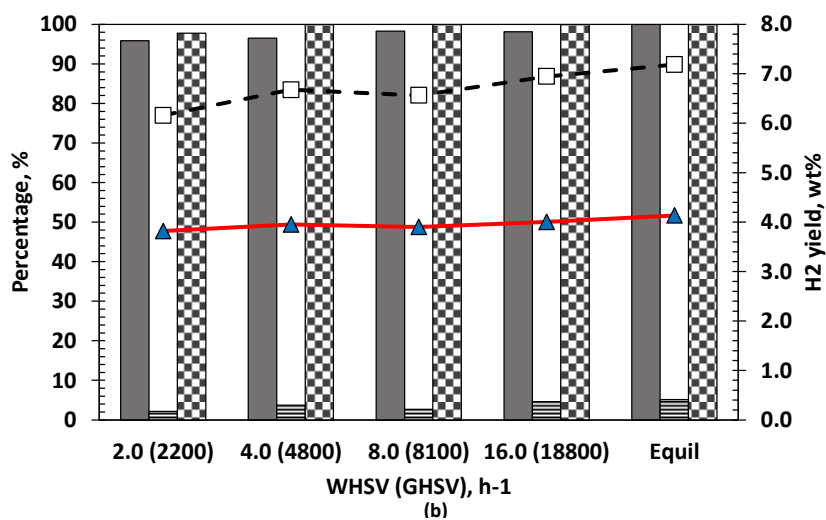
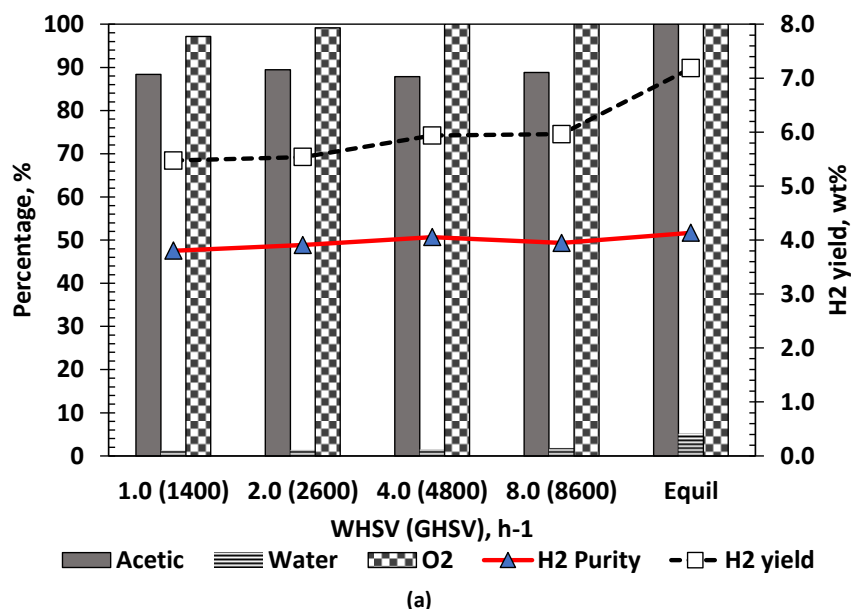


Figure S5 H₂ purity, H₂ yield, and conversion of acetic acid, water and oxygen with WHSV (GHSV) for the (a) Ni-Al, (b) Ni-CaAl and (c) Rh-Al catalysts in packed bed. All flows at S/C = 2 and $\lambda = 0.353$ corresponding to a reactor exit temperature of 570 °C.

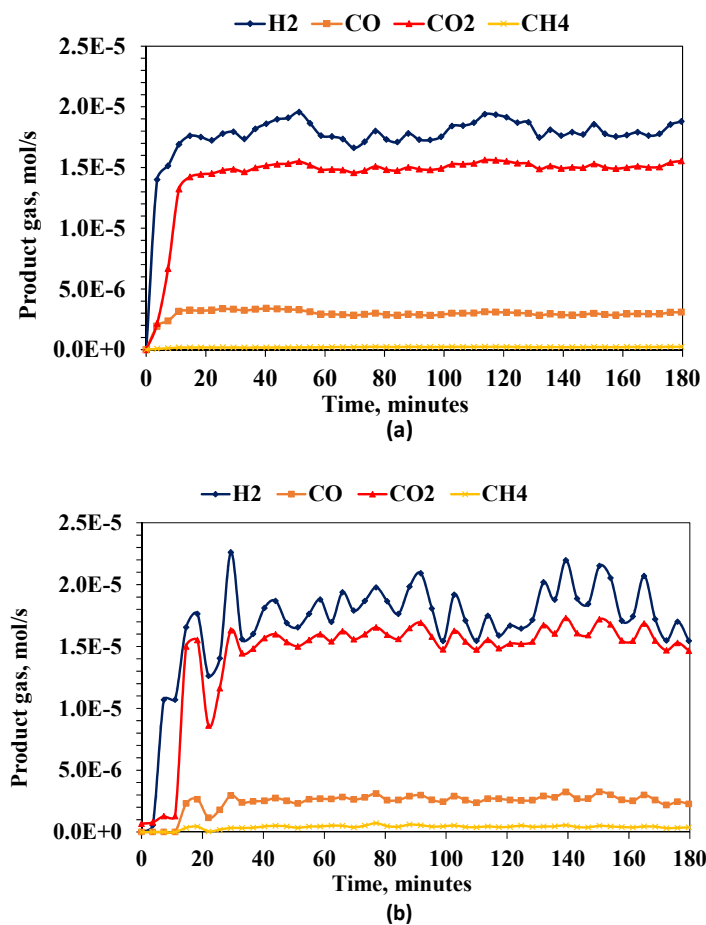


Figure S6 Dry N₂-free product gas with time on stream obtained during ATR of acetic acid flowing at 2 ml/h, S/C = 2, $\lambda = 0.353$ (Air flow = 43.3 ml/min), hot product gas at 570 °C and 1 bar. (a) R-M (b) RC-M.