Supporting information

Nano-nickel catalyst reinforced with silicate for methane decomposition to produce hydrogen and nanocarbon: synthesis by co-precipitation cum modified Stöber method

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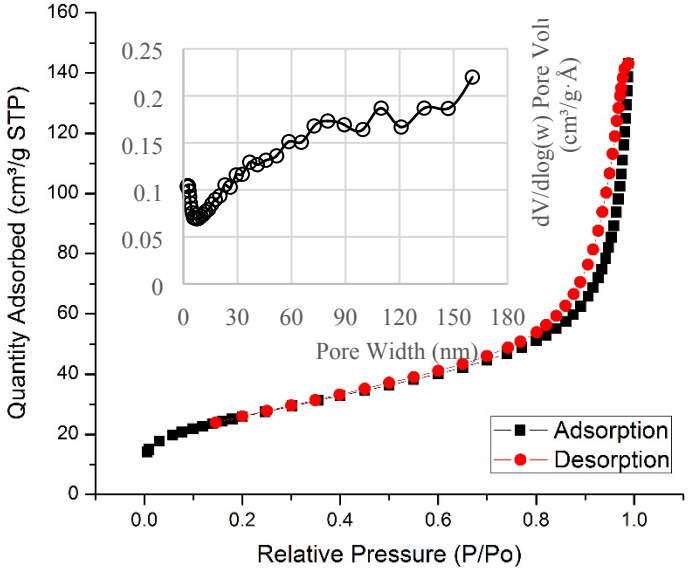
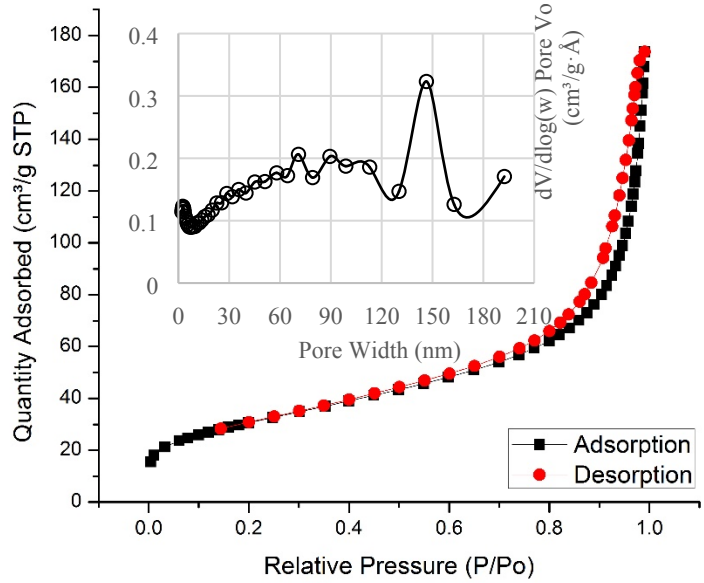
BET



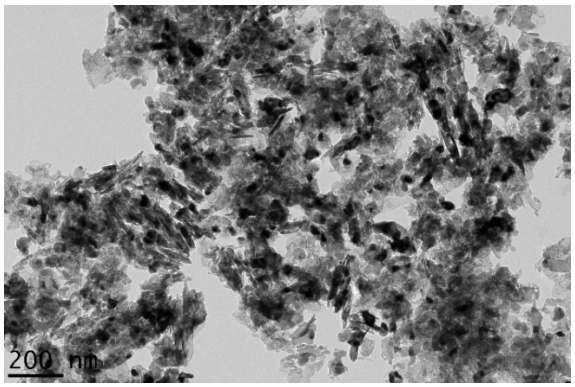
a)



b)

Fig. S1 Loops of N_2-adsorption–desportion isotherms of a) n-NiO/SiO_2 (0.04) and b) n-NiO/SiO_2 (0.06) catalyst. The inset plot shows the pore diameter distributions calculated with Barrett–Joyner–Halenda (BJH) method.

HRTEM

a) 

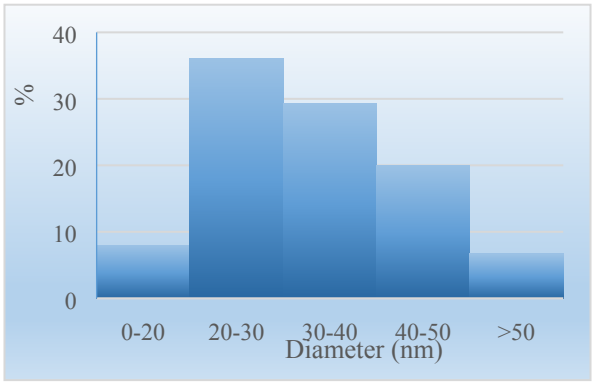
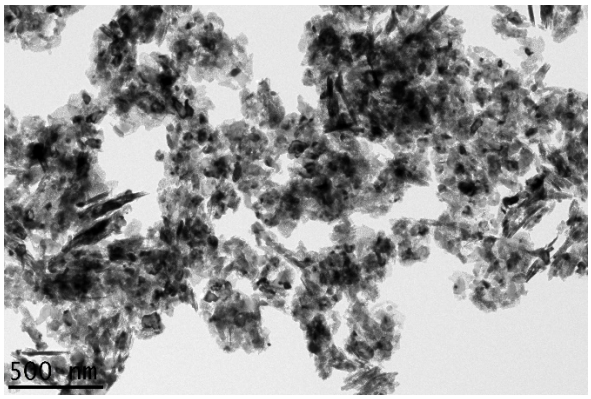
b) 

Fig. S2 a) HRTEM image and b) particle size distribution of n-NiO/SiO_2 (0.04)

a) 

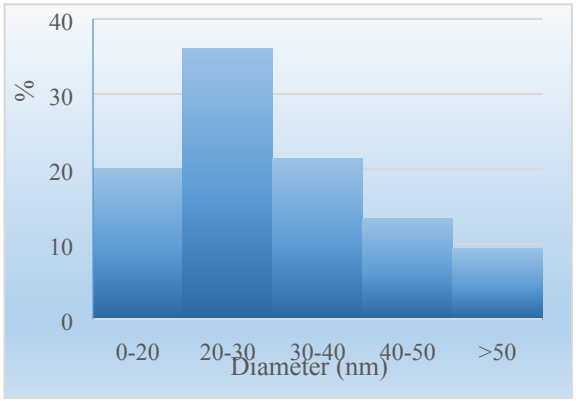
b) 

Fig. S3 a) HRTEM images, b) particle size distribution of n-NiO/SiO_2(0.06). 75 nanoparticle were considered to find out the particle size distribution using ImageJ software.

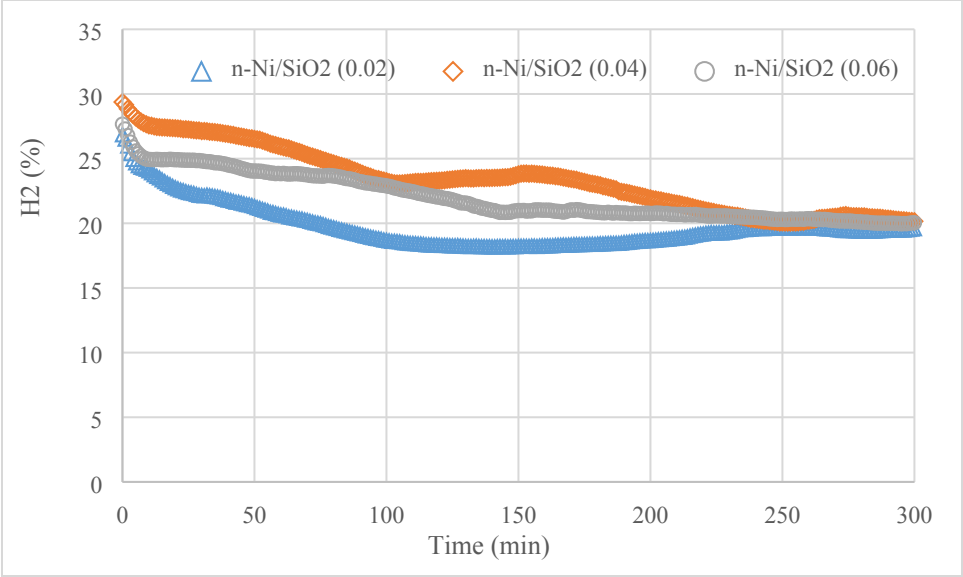


Fig. S4 Comparison of catalytic activity and stability of n-Ni/SiO_2 (0.02), n-Ni/SiO_2 (0.04) and n-Ni/SiO_2 (0.06) at 550°C. Methane feed flow rate = 0.64L/min and catalyst weight = 0.5gm.

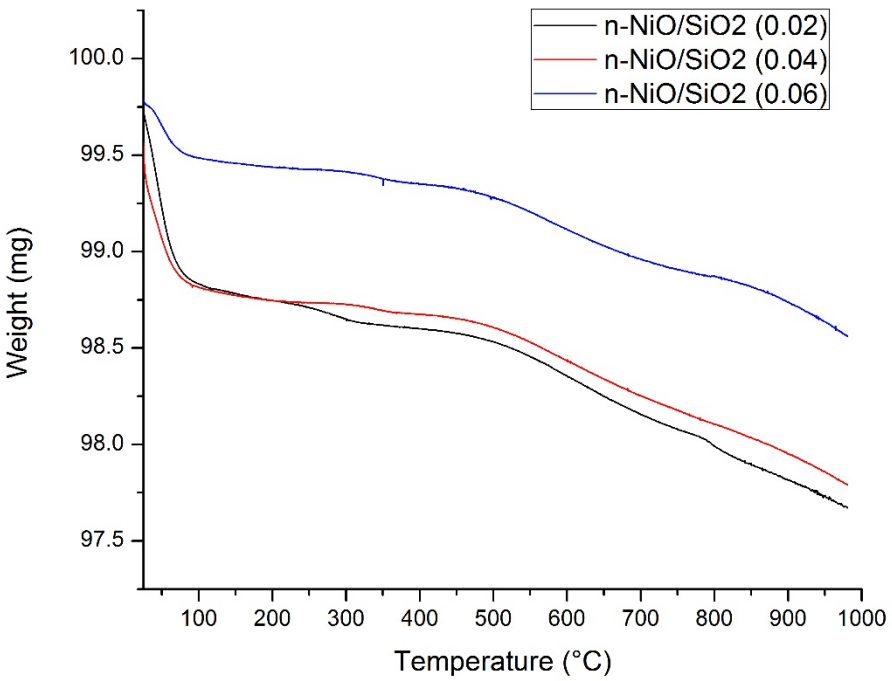


Fig. S5 TGA curves of n-Ni/SiO_2 (0.02), n-Ni/SiO_2 (0.04) and n-Ni/SiO_2 (0.06).