Electronic Supplementary Information

Structured Ni catalysts on Porous Anodic Alumina Membranes for Methane Dry Reforming: $NiAl_2O_4$ Formation and Characterization

L. Zhou,*ab Y.Guo,*a J-M. Bassetb and H. Kameyamac

[a] State Key Laboratory of Materials-Oriented Chemical Engineering, College of Chemistry and Chemical Engineering, Nanjing Tech University, 5, Xinmofan Road, NanJing, JiangSu 210009, PR China. Email: zhoulu1104@gmail.com
[b] KAUST Catalysis Center, King Abdullah University of Science and Technology, Thuwal 23955-6900,Saudi Arabia.
[c] Department of Chemical Engineering, Tokyo University of Agriculture and Technology, 24-16, Nakacho 2, Koganei-shi, Tokyo 184-8588, Japan.

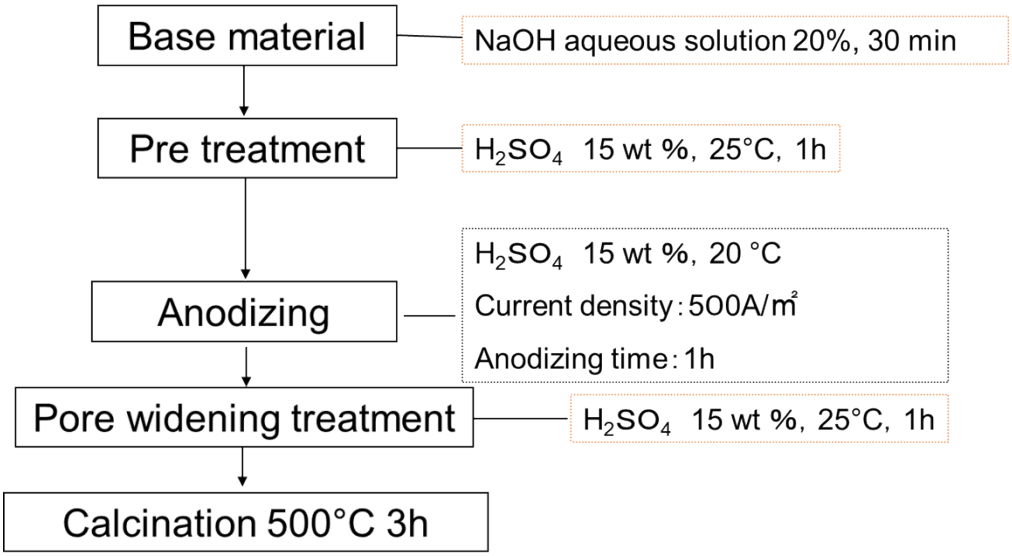

Fig. S1. The schematic diagram of anodization treatment condition

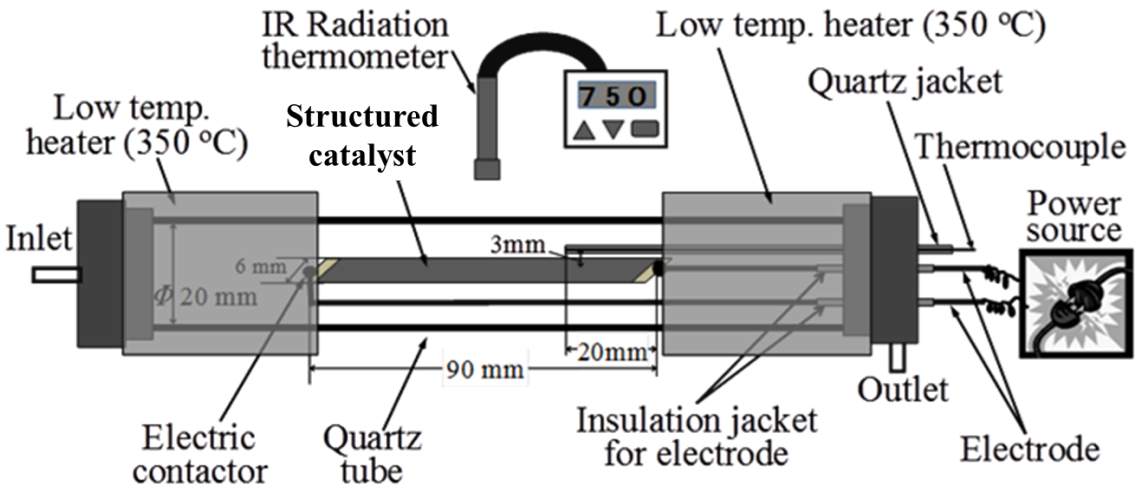

Fig. S2. The schematic diagram of home-made electrical heating reactor

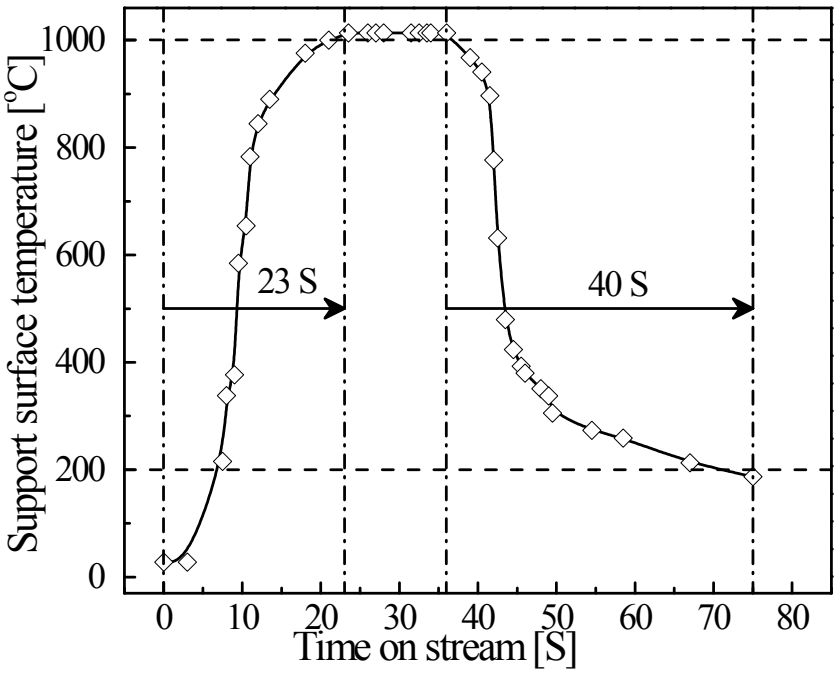

Fig. S3. The temperature increasing profile when using electrical heating reactor

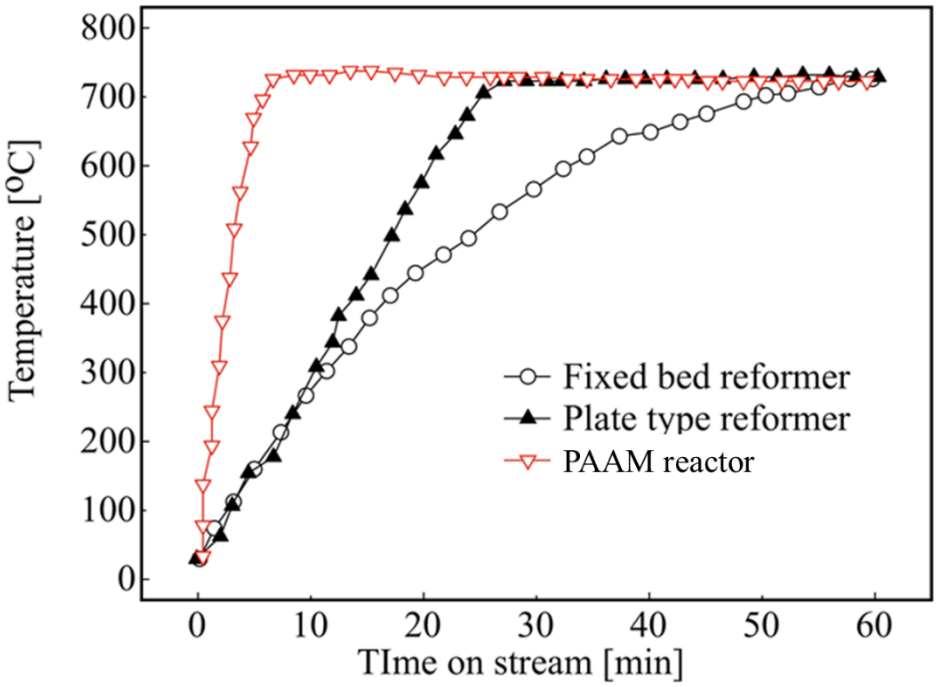

Fig. S4. The starting up time profile when using different catalysts

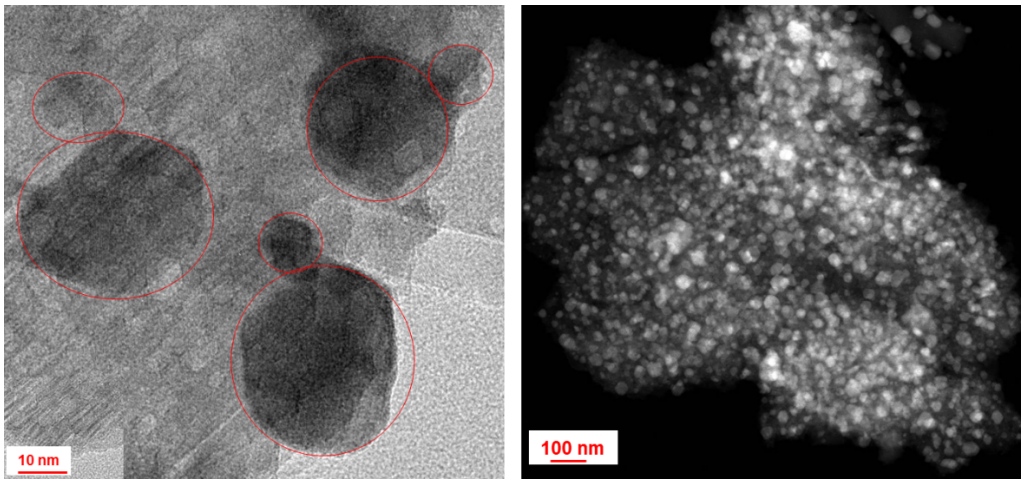

Fig. S5. Electronic microscope images over reduced Ni/PAAM$_{(900)}$: Left. TEM image; Right STEM image.

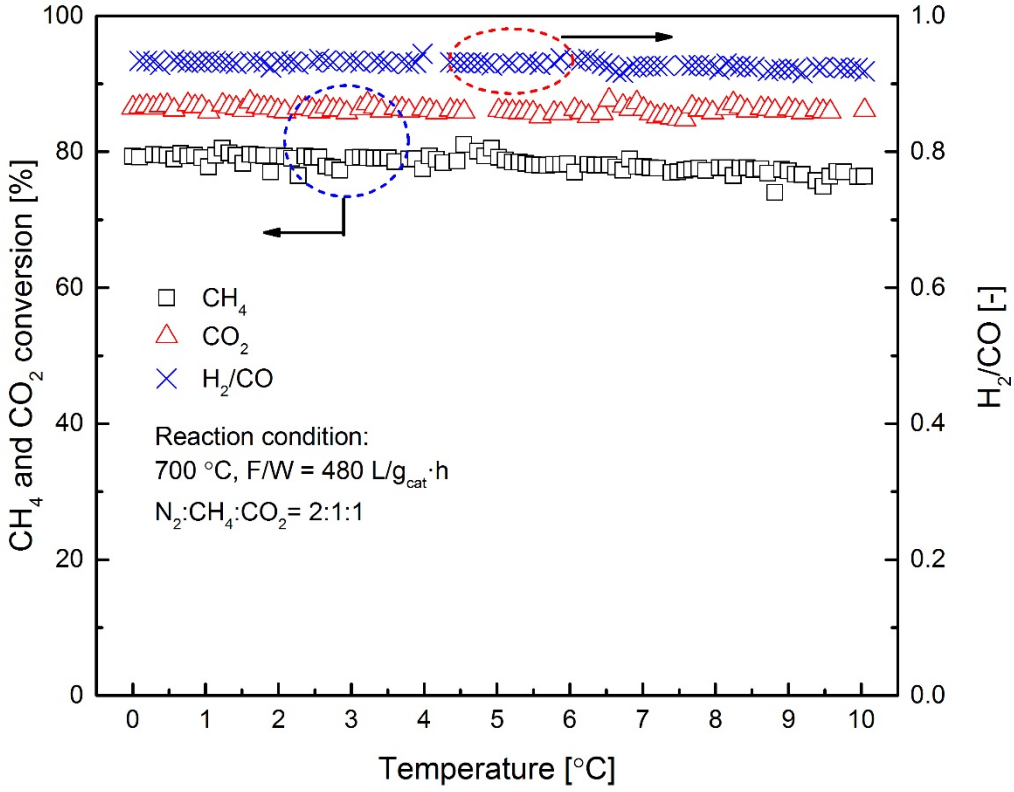

Fig. S6. The composition of outlet gas during MDR over Ni/PAAM$_{(900)}$

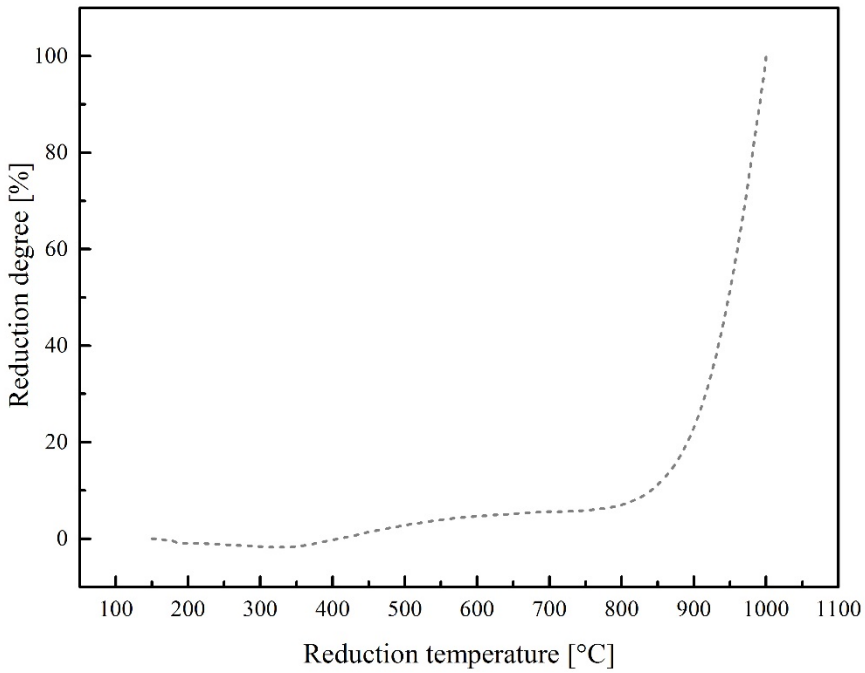

Fig. S7. The reduction degree based on the TGA data over Ni/PAAM$_{(900)}$

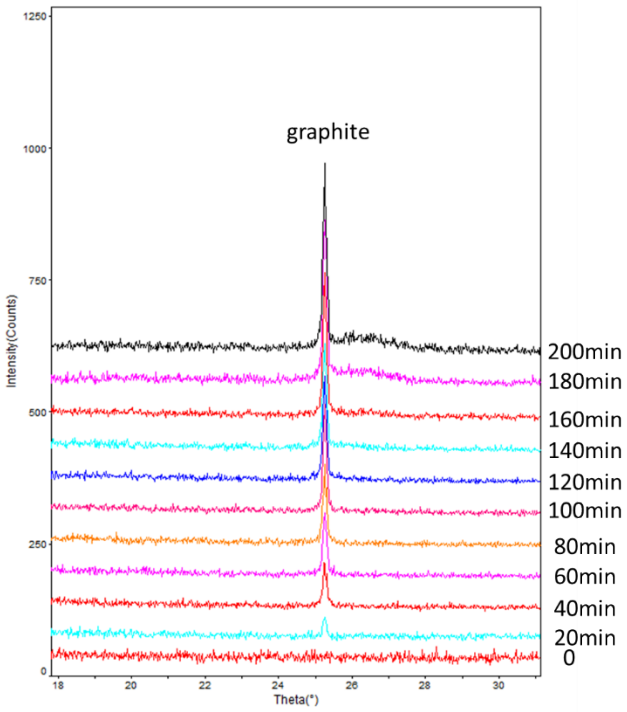

Fig.S8. insitu-XRD patterns during MDR of Ni/PAAM(350)