

Supplementary Materials

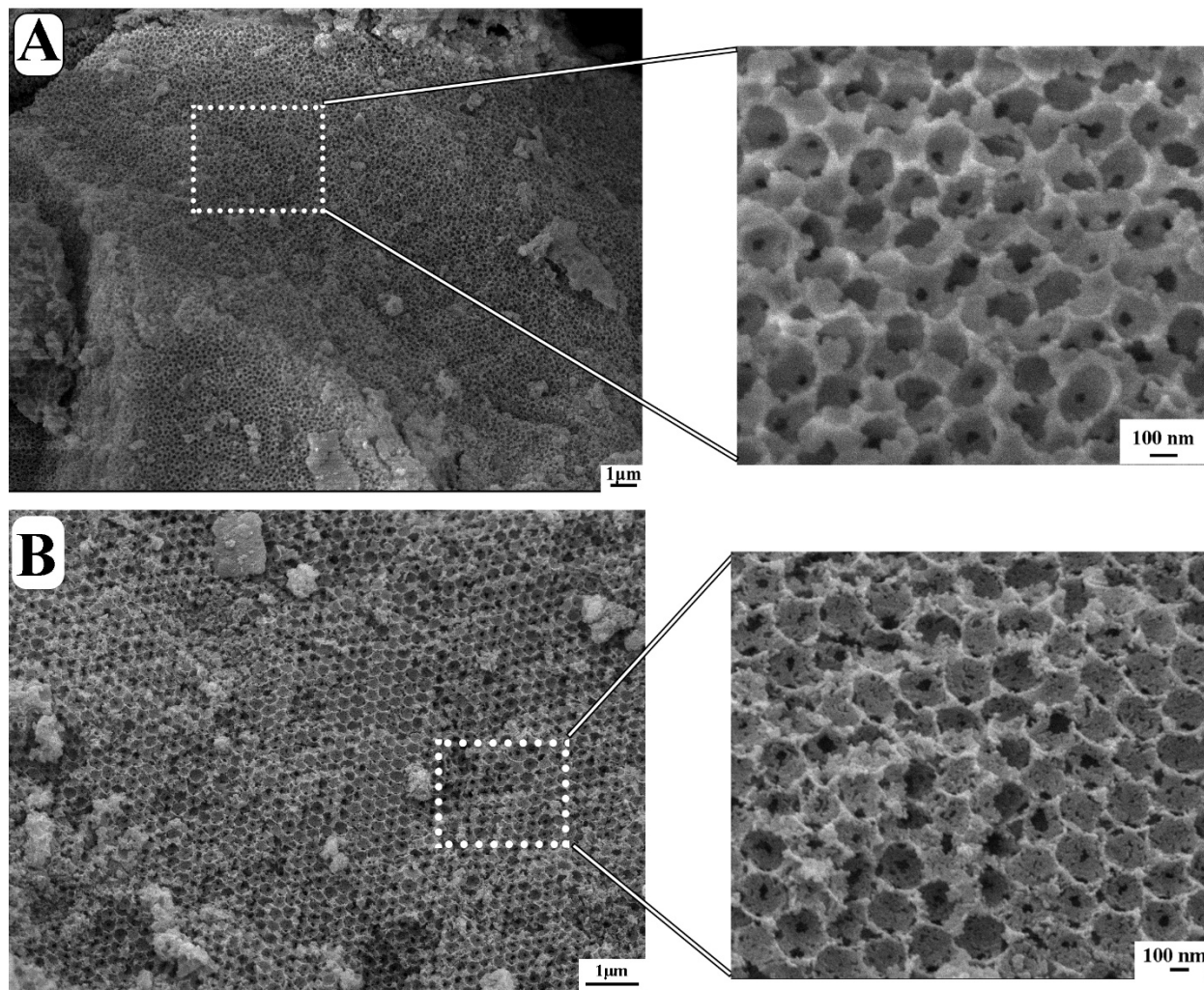


Figure S1. The SEM images of (A) Ni-MaAl and (B) 2K/Ni-MaAl.

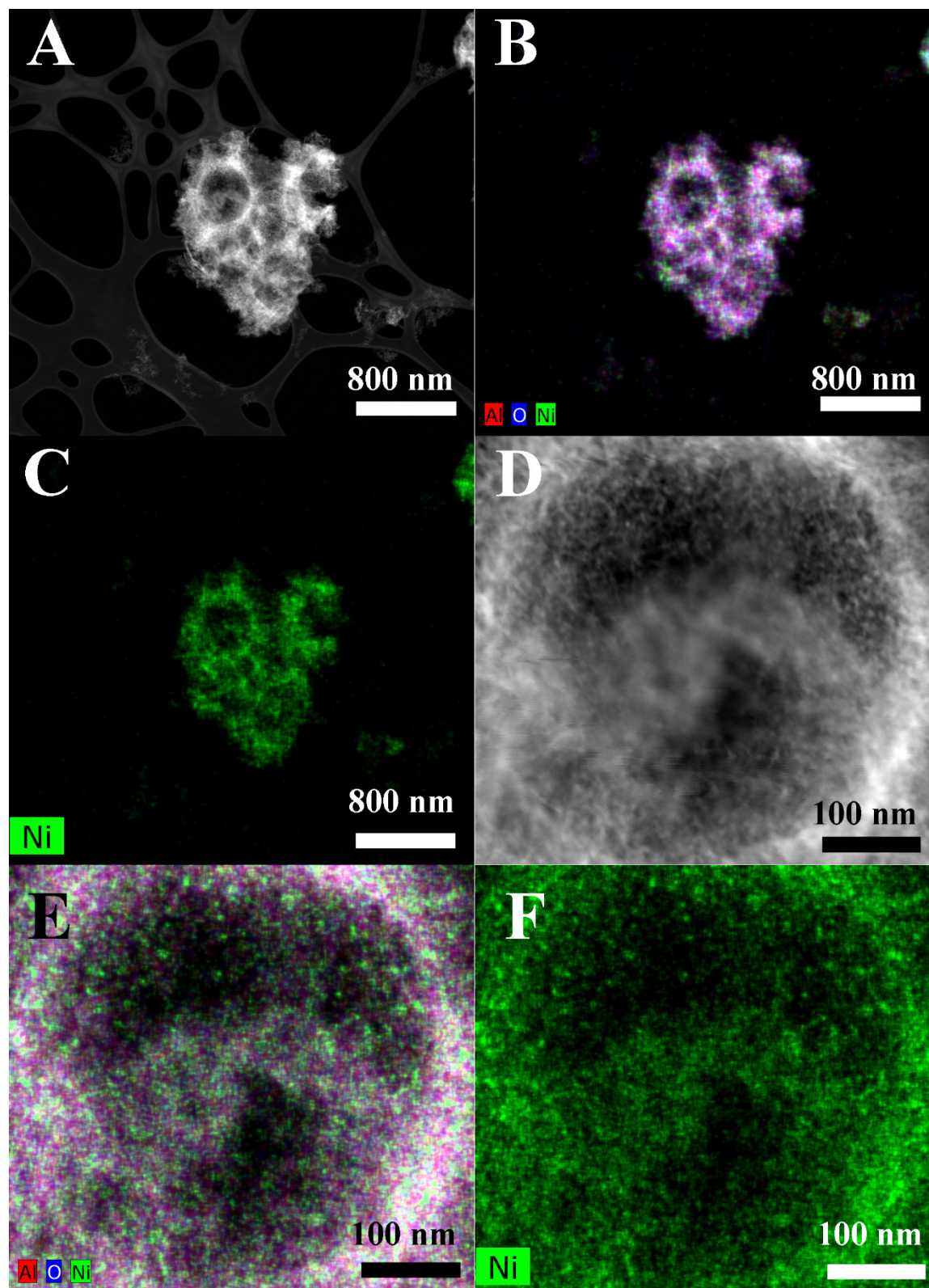


Figure S2. (A,D) the TEM images and (B,C,E,F) TEM-EDS mapping of Ni-MaAl.

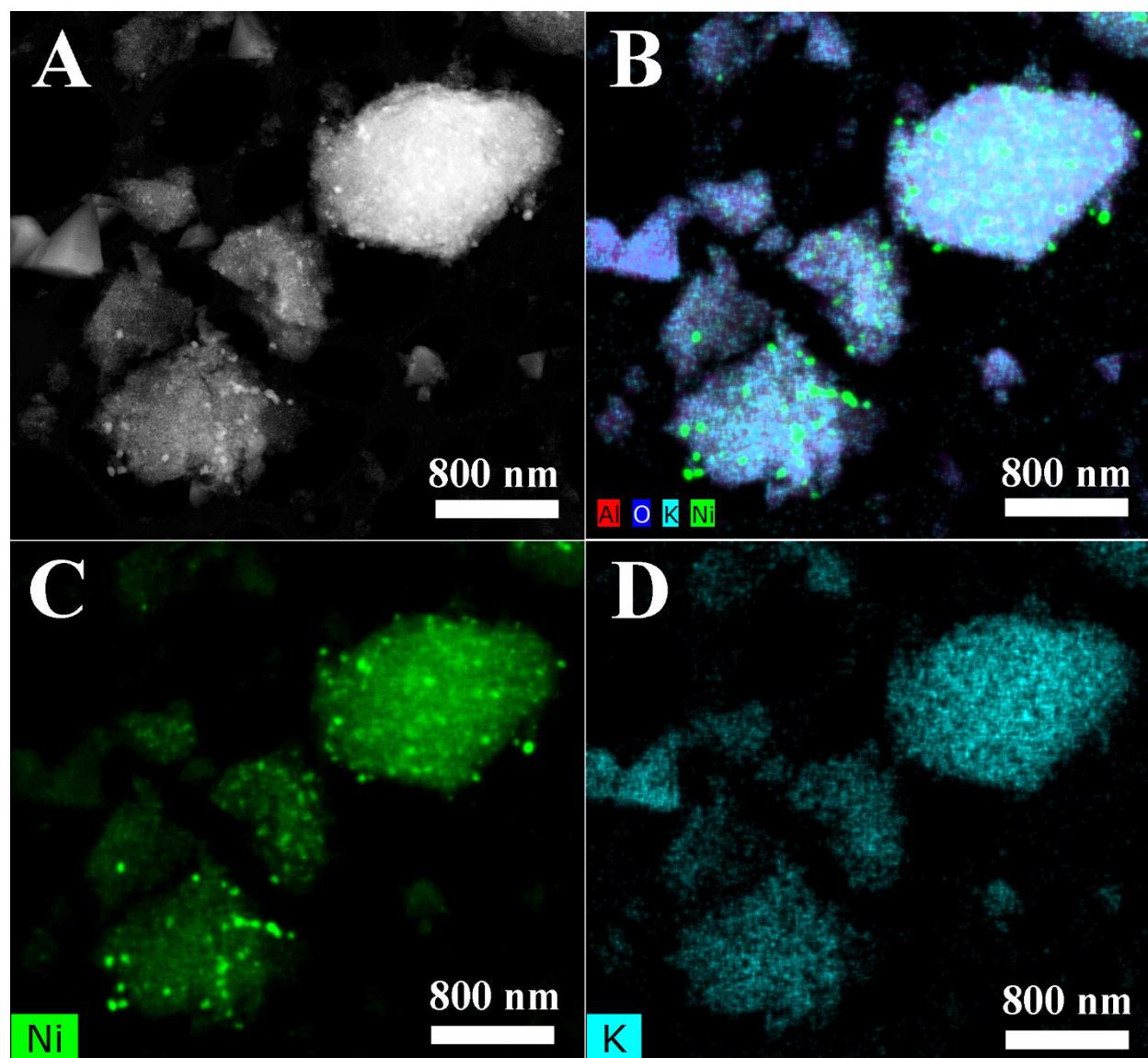


Figure S3. (A) the TEM image and (B,C,D) TEM-EDS mapping of 0.5K/Ni-MeAl.

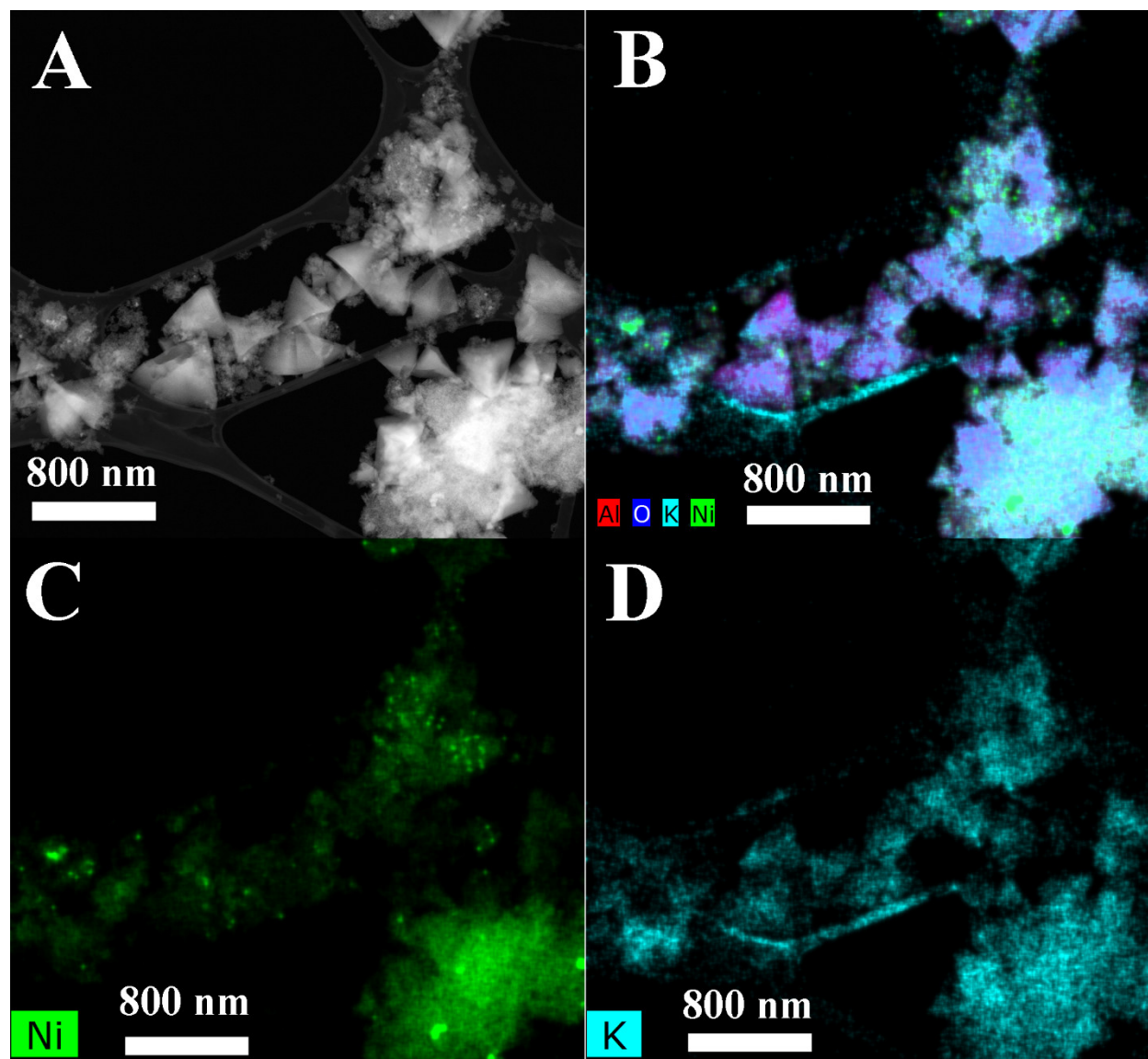


Figure S4. (A) the TEM image and (B,C,D) TEM-EDS mapping of 2K/Ni-MeAl..

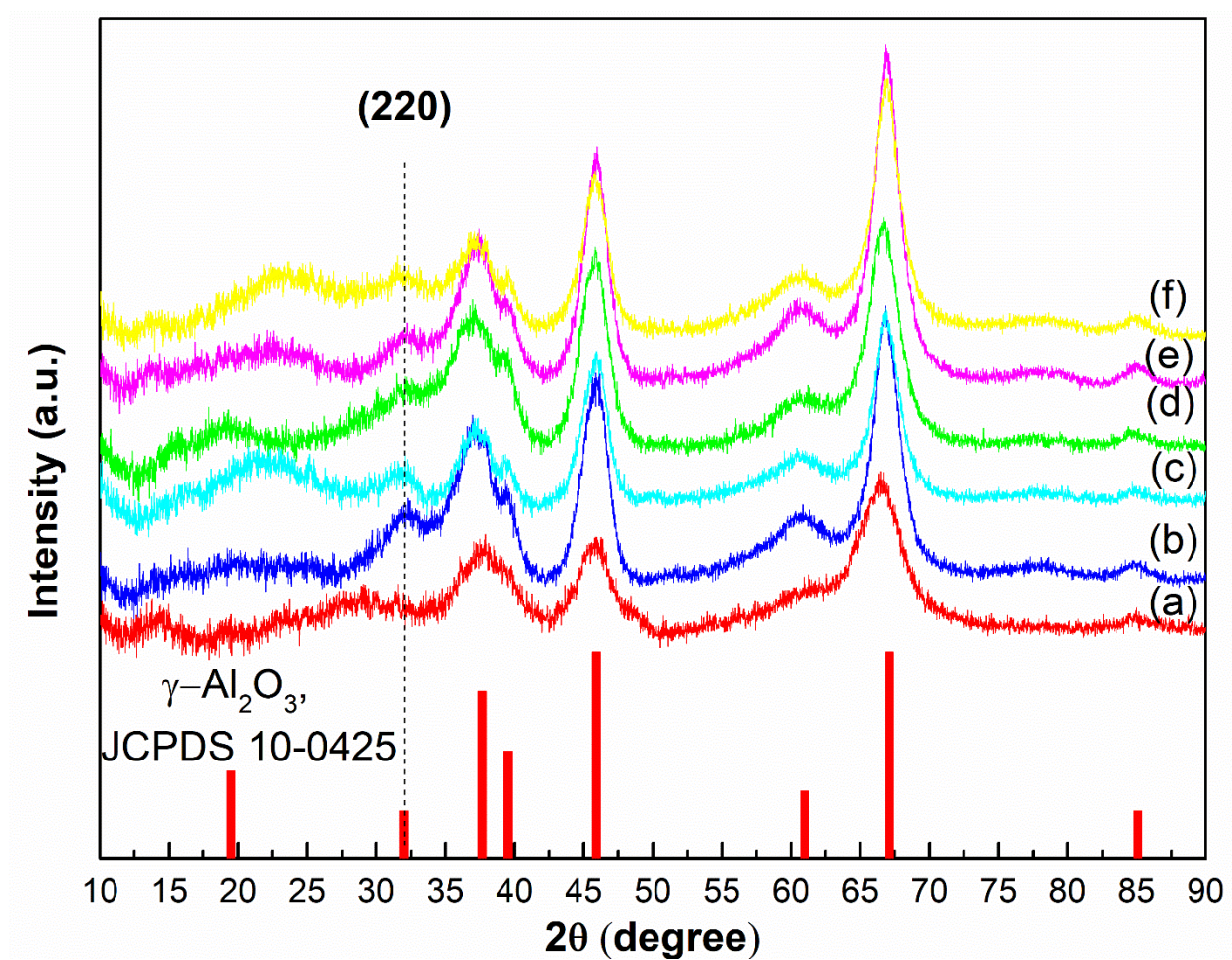


Figure S5. XRD patterns of (a) MeAl, (b) 2K/MeAl, (c) 5K/MeAl, (d) MaAl, (e) 2K/MaAl, and (f) 5K/MaAl.

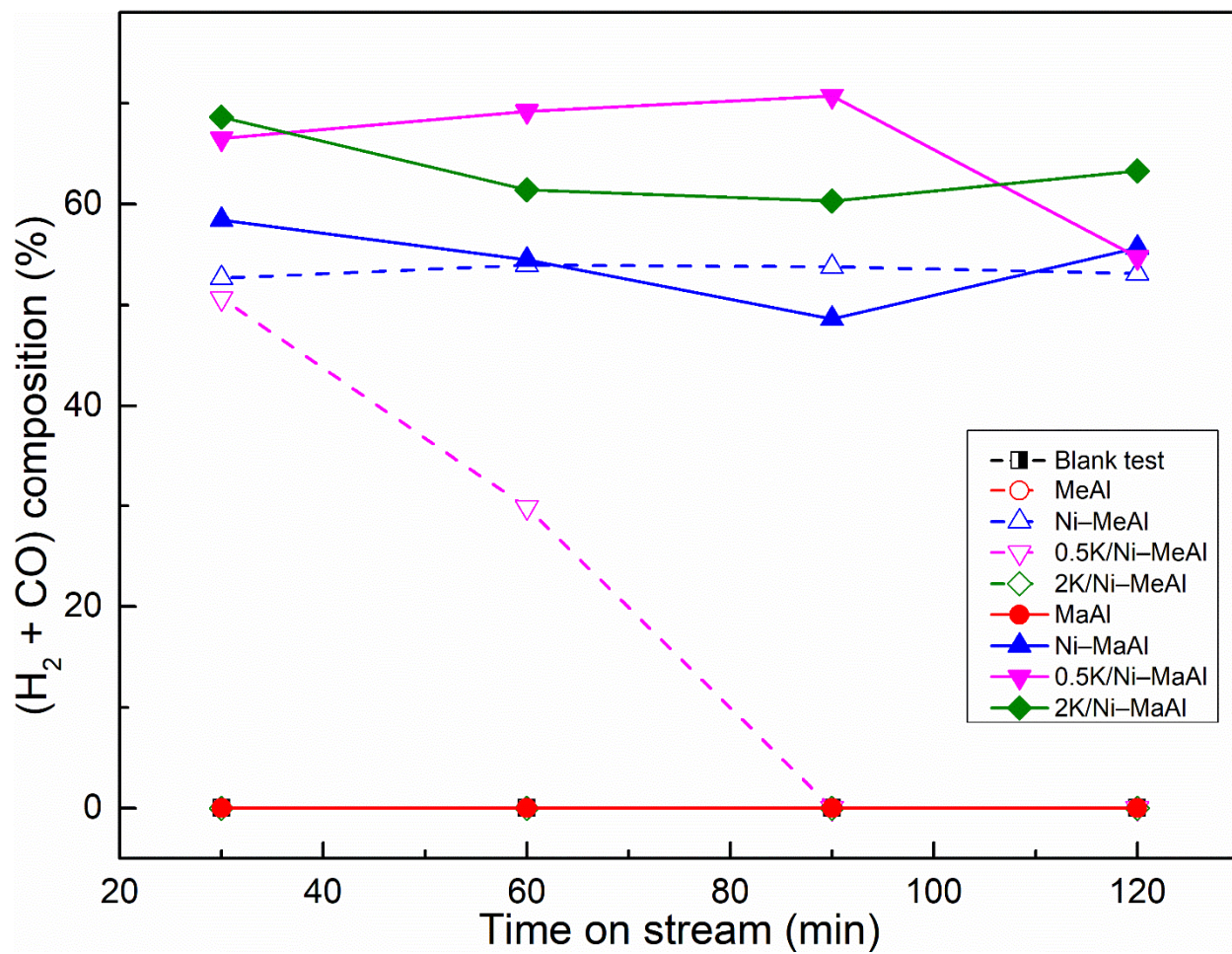


Figure S6. Time on the stream of total H₂ and CO composition in gas products. The values of the (H₂ + CO) composition from Blank test and the reactions over MeAl, 2K/Ni-MeAl, MaAl are zero and not clearly shown in the graph.

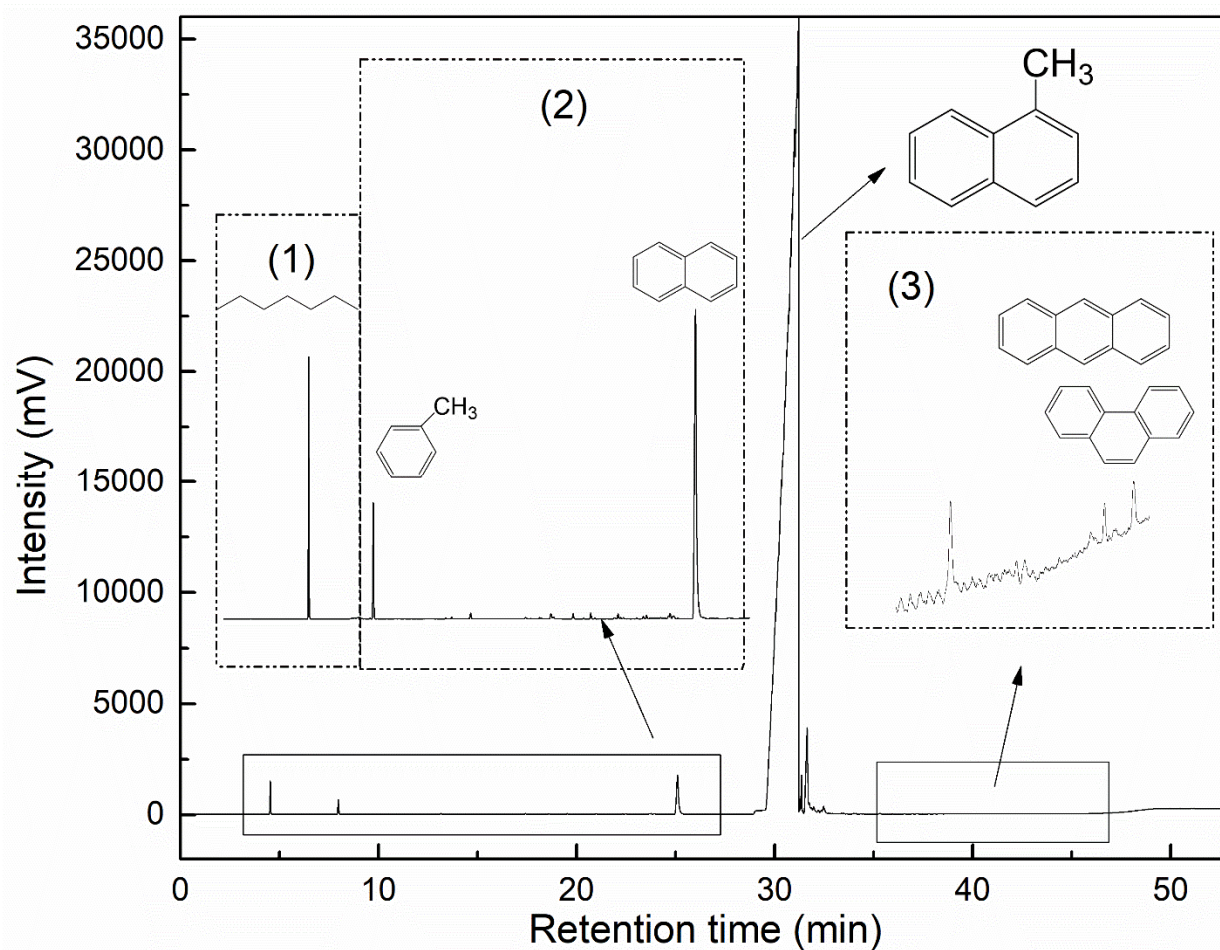


Figure S7. A typical gas chromatogram of liquid products (reaction conditions: Ni-MeAl catalyst, $T = 600\text{ }^{\circ}\text{C}$, $t = 2\text{ h}$, mass of catalyst = 0.25g, $F_{1\text{-methylnaphthalene}} = 0.14\text{ ml/min}$): (1) ring-Opened products, (2) aromatics, and (3) condensed products or polymerizates.

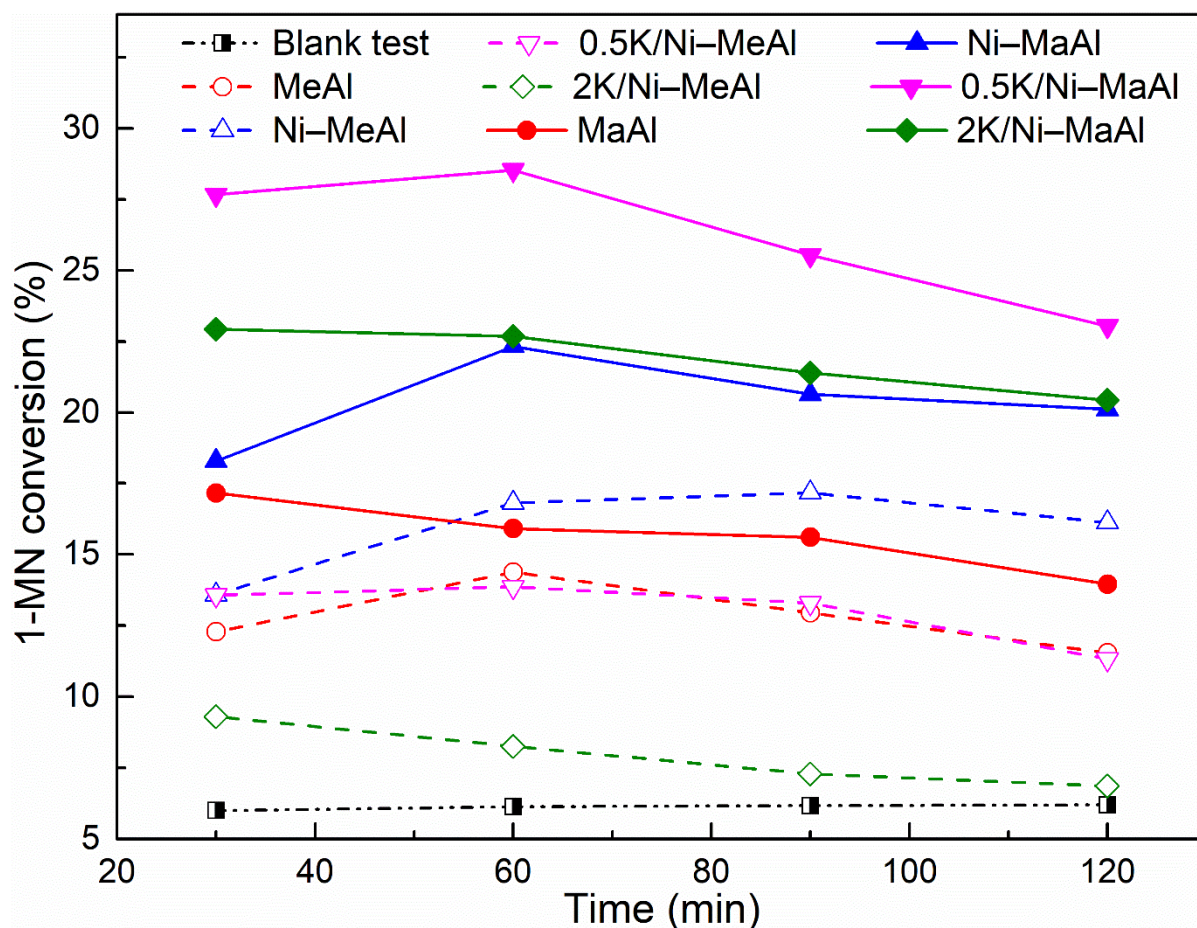


Figure S8. Time on the stream of 1-MN conversions for all catalysts.