Highly efficient Al doped Ni-Mn-O catalysts for auto-thermal reforming of acetic acid: Role of $MnAl_2O_4$ for stability of Ni species

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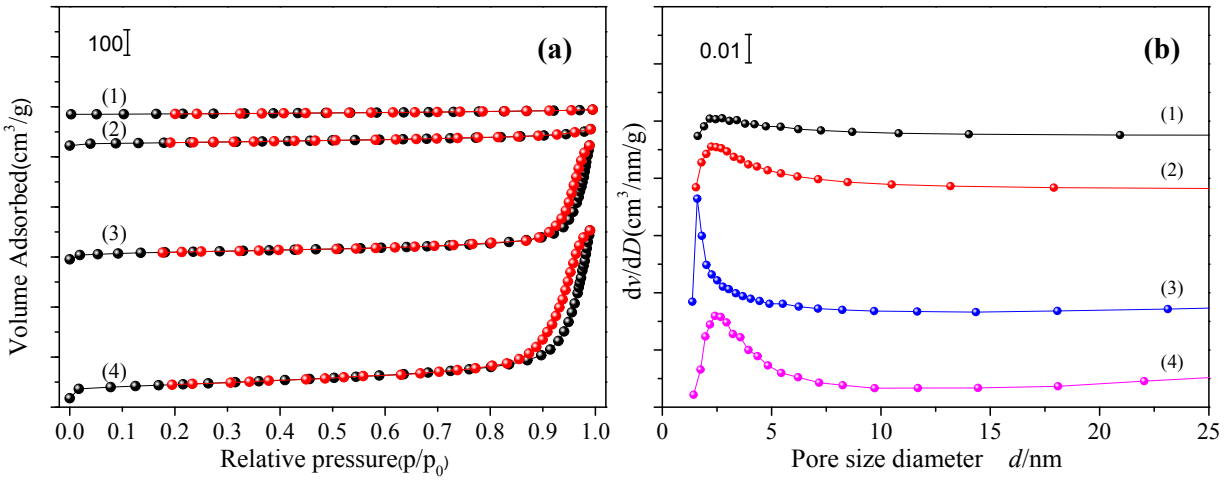

Fig. S1. (a) Nitrogen adsorption-desorption isotherms and (b) pore size distributions of calcined NM-xA catalysts: (1) NM; (2) NM-0.25A; (3) NM-0.5A; (4) NM-1A

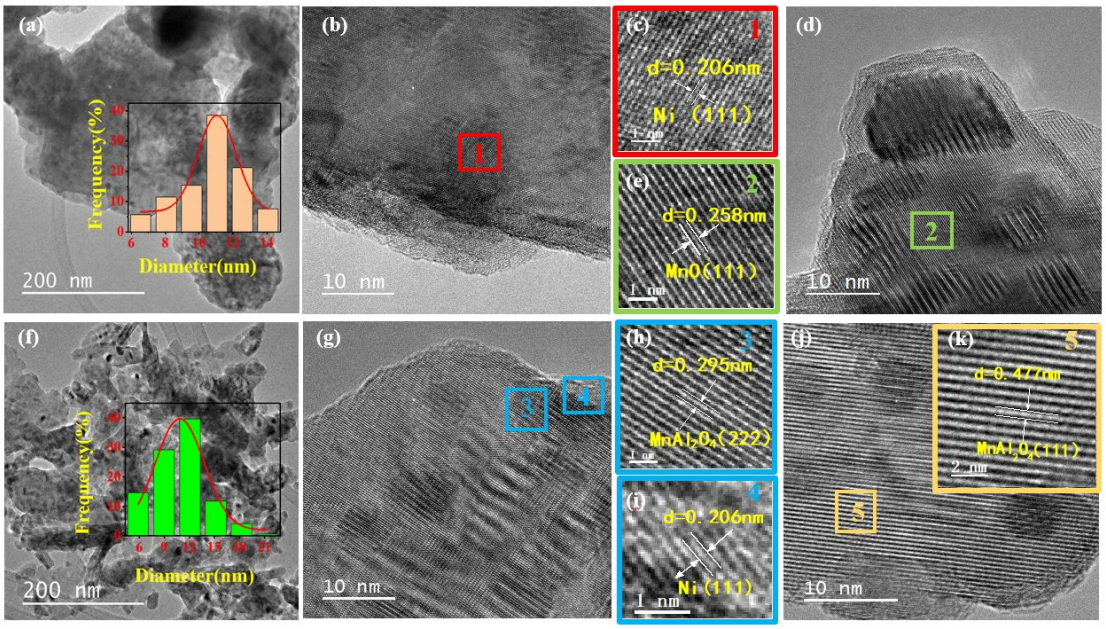

Fig. S2. (a, b, d) TEM images and (c,e) HRTEM images of the reduced NM; (f, g, j) TEM images and (h, i, k) HRTEM images of the reduced NM-0.5A.

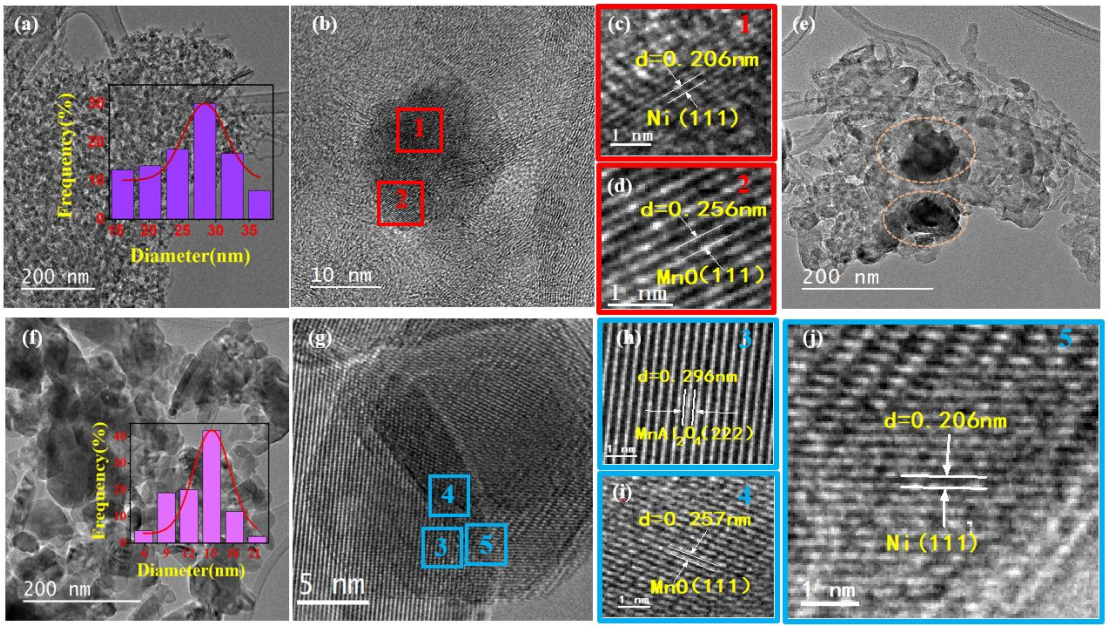

Fig. S3. (a, b, e) TEM images and (c, d) HRTEM images of the spent NM; (f, g ,j) TEM images and (h,i) HRTEM images of the spent NM-0.5A.

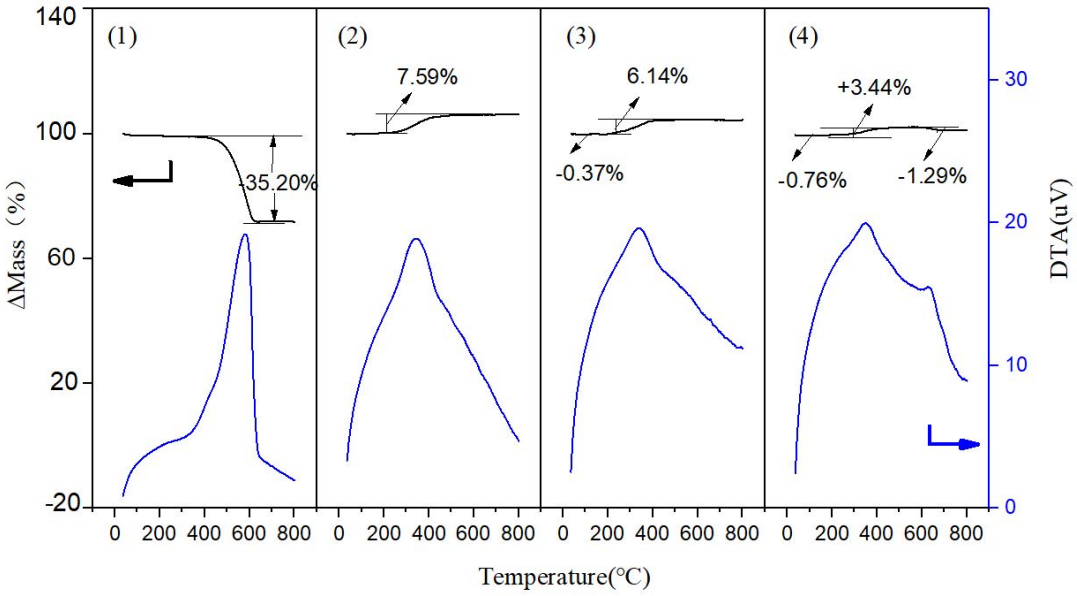

Fig. S4. TG-DTA profiles of spent NM-xA catalysts: (1) NM; (2) NM-0.25A; (3) NM-0.5A;(4) NM-1A