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Supplementary material

Nano-confined Manganese Oxide on SBA-15 for Ethylene Catalytic Oxidation

Mohamad Abou-Daher^{a, b}, Hassnain Abbas Khan^a, Georgian Melinte^c, Sarah Komaty^b, Javier Ruiz-Martinez^{b*}, Aamir Farooq^{a*}

^a King Abdullah University of Science and Technology (KAUST), Clean Energy Research Platform, Physical Sciences and Engineering Division, Thuwal 23955-6900, Saudi Arabia

^b King Abdullah University of Science and Technology (KAUST), KAUST Catalysis Center, Physical Sciences and Engineering Division, Thuwal 23955-6900, Saudi Arabia

^cImaging and Characterization Lab ,King Abdullah University of Science and Technology (KAUST)

*Corresponding author email: Prof. Aamir Farooq (aamir.farooq@kaust.edu.sa)

*Corresponding author email: Prof. Javier Ruiz Martinez (javier.ruizmartinez@kaust.edu.sa)



Figure S1 Particle size distribution of Spent catalysts



Figure S2 Growth of MnO_x nanoparticles in a TEM bright field (200 kV). The time from the start of the irradiation is displayed on each image (in min). As can be seen, there is diffusion of MnO_x on the surface. Beam current density: 200 A/cm²



Figure S3 Growth of MnO_x nanoparticles in a TEM bright field (200 kV) for 20Mn/SBA-15_d. The time from the start of the irradiation is displayed on each image (in min). As can be seen, there is diffusion of MnO_x on the surface. Beam current density: 200 A/cm2



Figure S4 Particle size distribution of 20Mn/SBA-15_d at different time intervals

| Catalyst | Nominal Mn loading | XRF Mn Loading [%] |
|--------------------------|--------------------|--------------------|
| 10Mn/SBA-15 _d | 10 | 9.32% |
| 15Mn/SBA-15 _d | 15 | 15.45% |
| 20Mn/SBA-15 _d | 20 | 20.54% |
| 25Mn/SBA-15 _d | 25 | 24.47% |
| 30Mn/SBA-15 _d | 30 | 28.81% |
| 20Mn/SBA-15 _w | 20 | 19.81% |

Table S1 XRF catalysts Mn loading



Figure S5 Conversion per Mn loading at 225 $^\circ\text{C}$ for Mn/SBA-15_d catalysts



Figure S6 Effect of temperature on TOF of Mn/SBA-15_d catalysts



Figure S7 Conversion at 225 $^\circ\text{C}$ for Mn/SBA-15_d catalysts



Figure S8 Light-off and Light-on catalytic activity of 20Mn/SBA-15 $_{d}$