# PdO Nanoparticles Supported on $\mathrm{MnO}_{2}$ Nanowire Aerogels as Catalysts for Low-Temperature Methane Combustion 

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Figure S1. Particle size distribution for PdO nanoparticles in $\mathrm{PdO} / \mathrm{MnO}_{2}$ nanowire aerogel catalysts.


Figure S2. Water stability measurements at different temperature (a) and light-off curves before/after stability test (b) for $1.4 \mathrm{wt} \% \mathrm{Pd}$ on $\mathrm{MnO}_{2}$. The black arrow indicates the order of measurements. The stability was tested from low to high temperature.


Figure S3. Water stability measurements at different temperature (a) and light-off curves before/after stability test (b) for $1.4 \mathrm{wt} \% \mathrm{Pd}$ on the $\mathrm{MnO}_{2}$ nanowire aerogel. The black arrow indicated the order of measurements. The stability was tested from high to low temperature.


Figure S4. PXRD patterns for PdO on $\mathrm{MnO}_{2}$ nanowire aerogel catalysts, comparing a fresh sample (bottom) with ones after stability testing. ■ Manganese oxide, $\alpha-\mathrm{MnO}_{2}$ (JCPDS 72-1982), palladinite, syn - PdO (JCPDS 85-0624).


Figure S5. PXRD pattern for a fresh $\mathrm{PdO} / \mathrm{Al}_{2} \mathrm{O}_{3}$ catalyst (bottom) compared to two samples after stability testing. ■ palladinite, syn - PdO (JCPDS 85-0624), ■ Aluminum Oxide - $\mathrm{Al}_{2} \mathrm{O}_{3}$ (JCPDS 50-0741), ■ Graphite - C (JCPDS 56-0159), ■ Moissanite-4H, syn - SiC (JCPDS 22-1317)


Figure S6. (a) Methane conversion for $1.4 \mathrm{wt} \% \mathrm{PdO}$ on $\mathrm{MnO}_{2}$ in the presence of $\mathrm{SO}_{2}$. (b) Catalytic activity for $1.4 \mathrm{wt} \% \mathrm{PdO}$ on $\mathrm{MnO}_{2}$ before and after $\mathrm{SO}_{2}$ treatment.

