

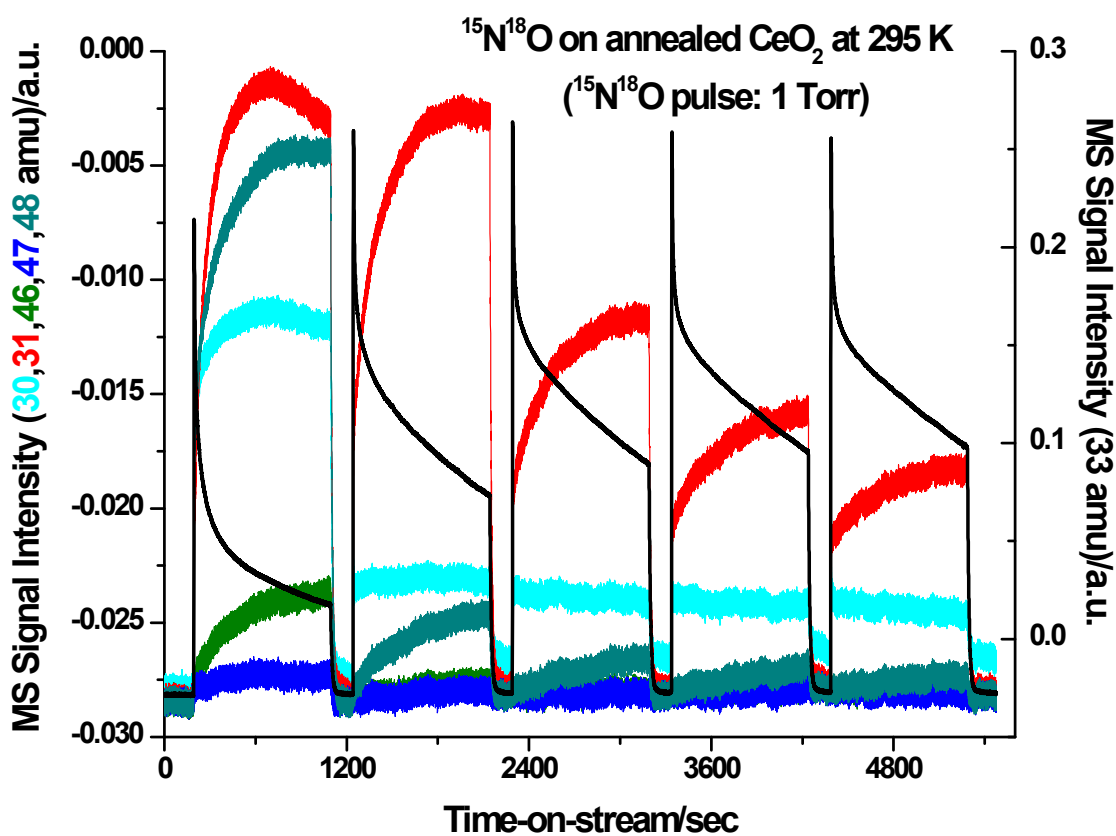
## Supplementary Information:

### $^{15}\text{N}_2$ formation and fast oxygen isotope exchange during pulsed $^{15}\text{N}^{18}\text{O}$ exposure of $\text{MnO}_x/\text{CeO}_2$

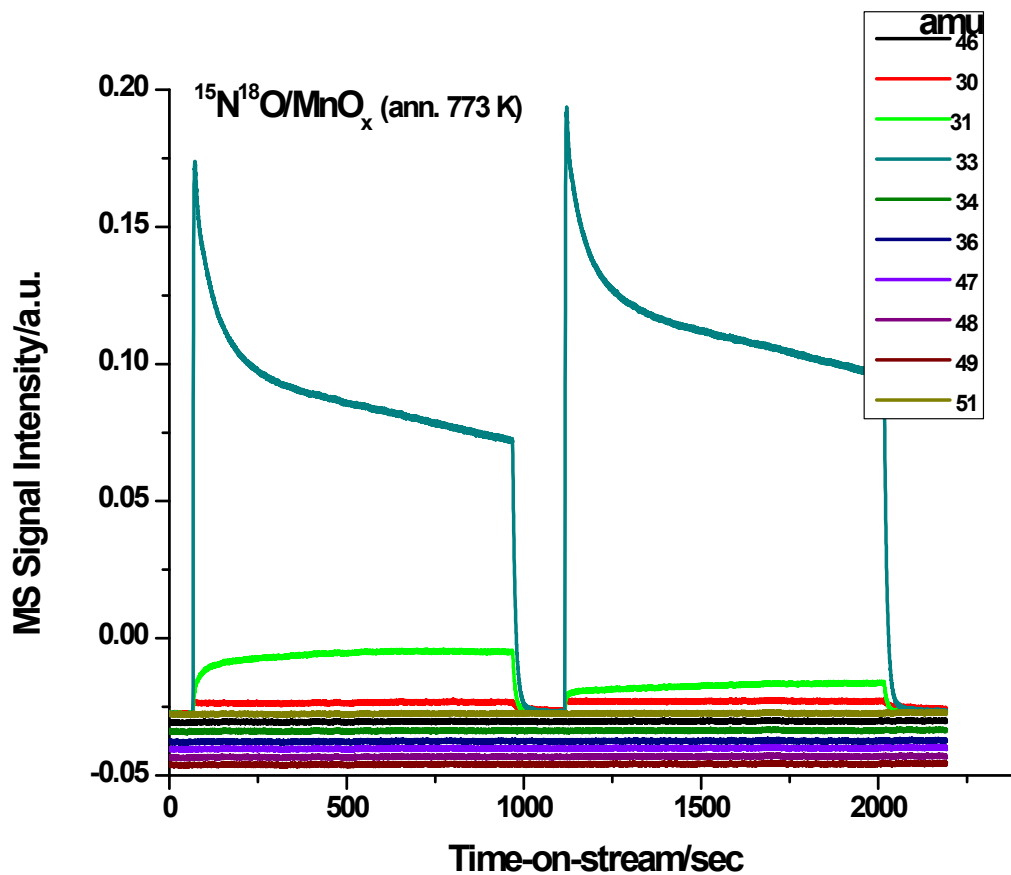
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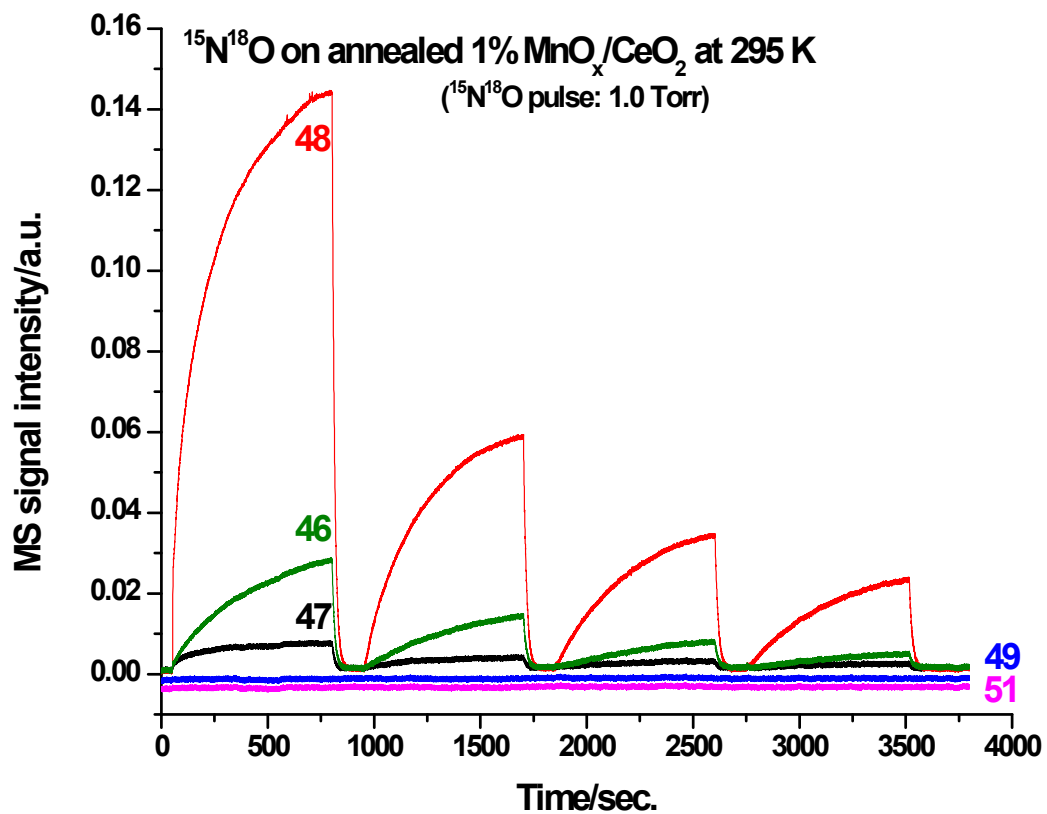
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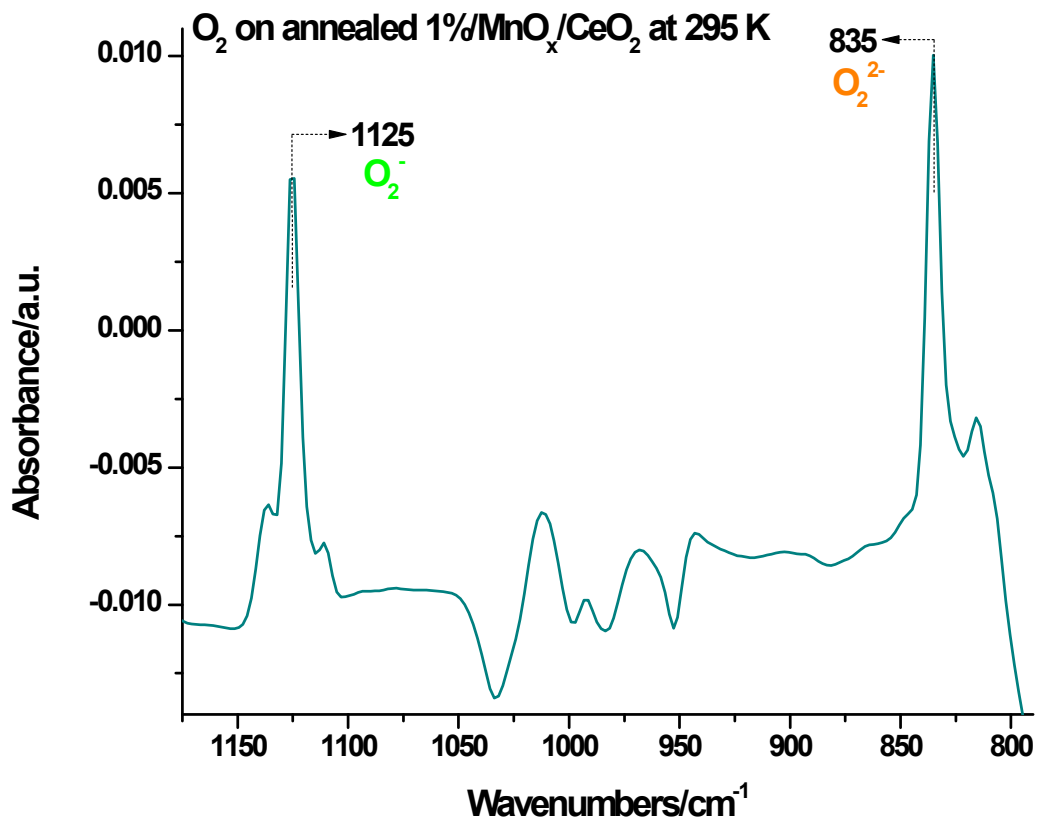
**Fig. S1.** MS signal intensities of selected masses during  $^{15}\text{N}^{18}\text{O}$  exposure of an annealed (773 K)  $\text{CeO}_2$  sample.



**Fig. S2.** MS signal intensities of selected mass fragments obtained during <sup>15</sup>N<sup>18</sup>O exposure of an annealed (773 K) MnO<sub>2</sub> sample.



**Fig. S3.** MS signals of the 46, 47, 48, 49 and 52 amu mass fragments during  $^{15}\text{N}^{18}\text{O}$  pulsing of an annealed 1%  $\text{MnO}_x/\text{CeO}_2$  sample at 295 K.



**Figure S4.** IR spectrum obtained from an annealed (at 823 K) 1% MnO<sub>x</sub>/CeO<sub>2</sub> sample after exposure to O<sub>2</sub> at 295 K.