Supporting Information

Nature of WO_x Sites on SiO_2 and their Molecular Structure-Reactivity/Selectivity Relationships for Propylene Metathesis

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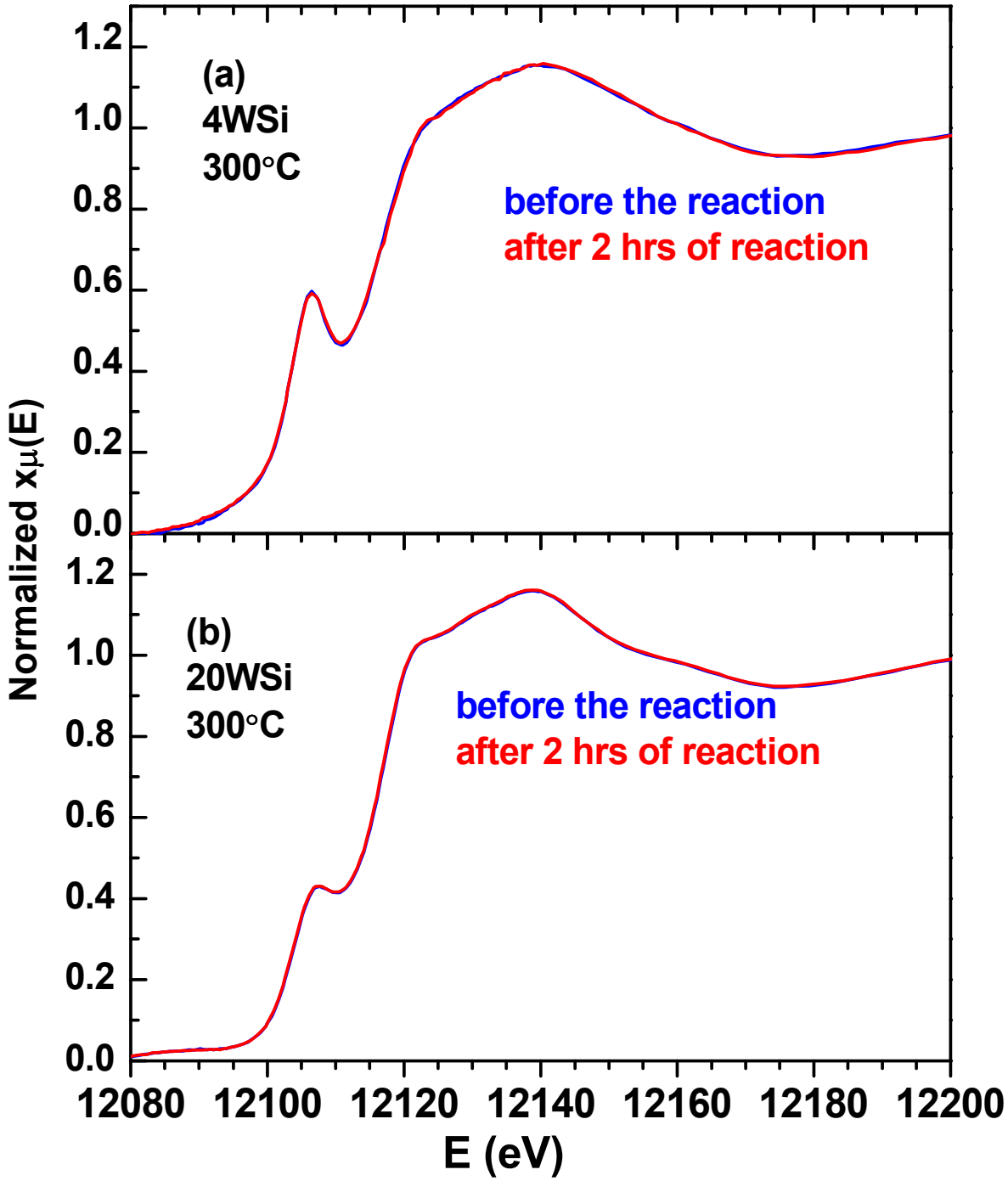

Figure S1. *In situ* W L_1-edge XANES spectra of the (a) 4% and (b) 20% supported WO_x/SiO_2 catalysts before and during reaction at 300°C.

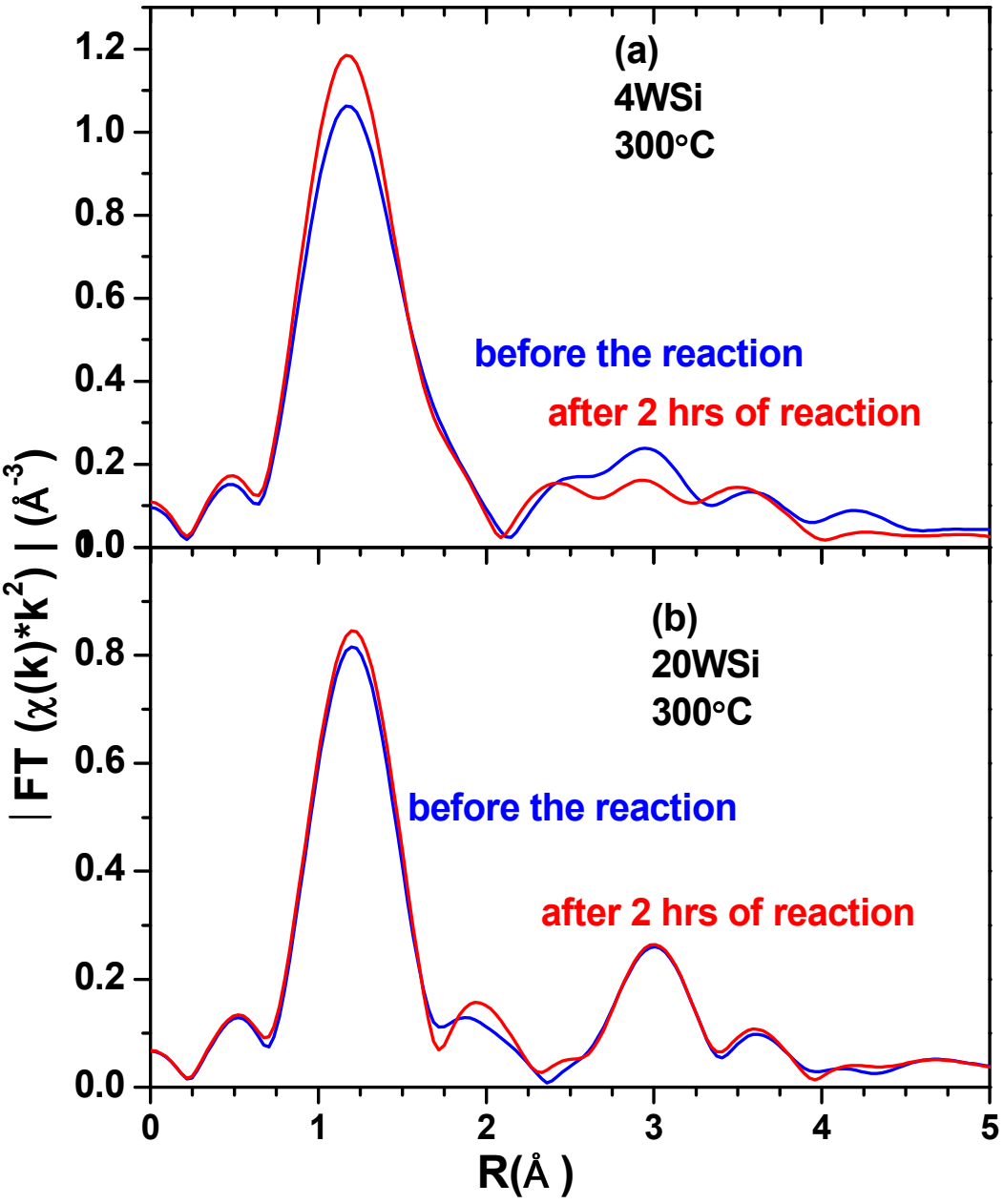

Figure S2. Magnitudes of Fourier-transformed k^2-weighted *in situ* W L_1-edge EXAFS spectra in non-phase-corrected *R* space for the (a) 4% and (b) 20% catalysts before (blue) and during reaction (red) at 300°C.

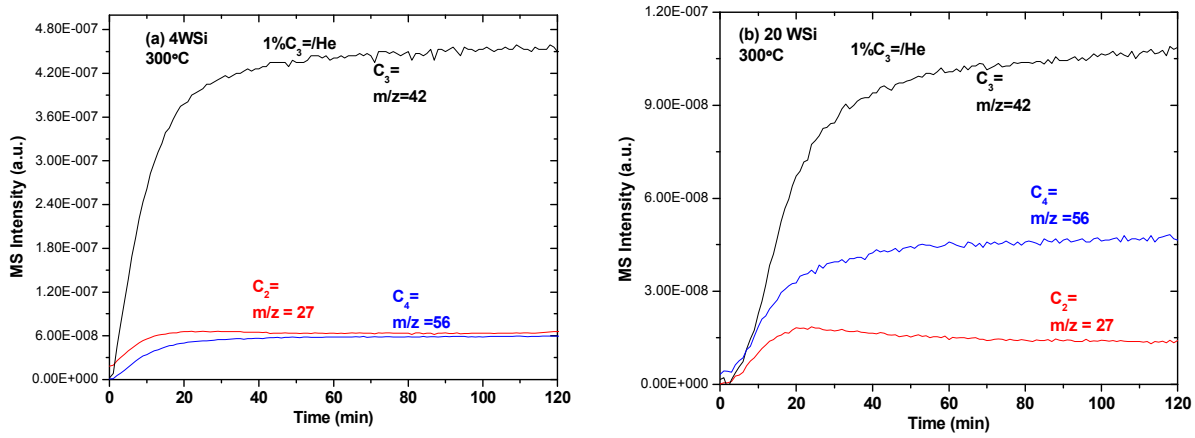

Figure S3. *Operando* MS spectra for the (a) 4% and (b) 20% catalyst which were simultaneously collected along with XANES/EXAFS measurements.

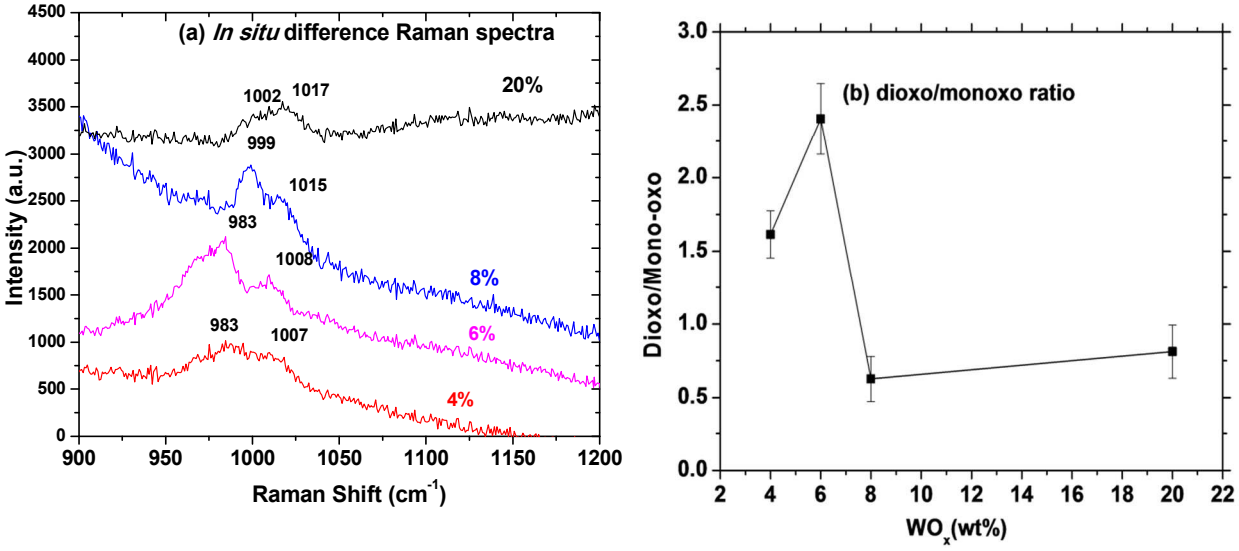

Figure S4. (a) *In situ* difference Raman spectra (442 nm) of the supported WO_x/SiO_2 catalysts under dehydrated conditions (flowing O_2/Ar at 300°C). The SiO_2 spectrum was subtracted from all of the spectra. (b) The ratio of dioxo/mono-oxo obtained from integration of their respective raw Raman bands.

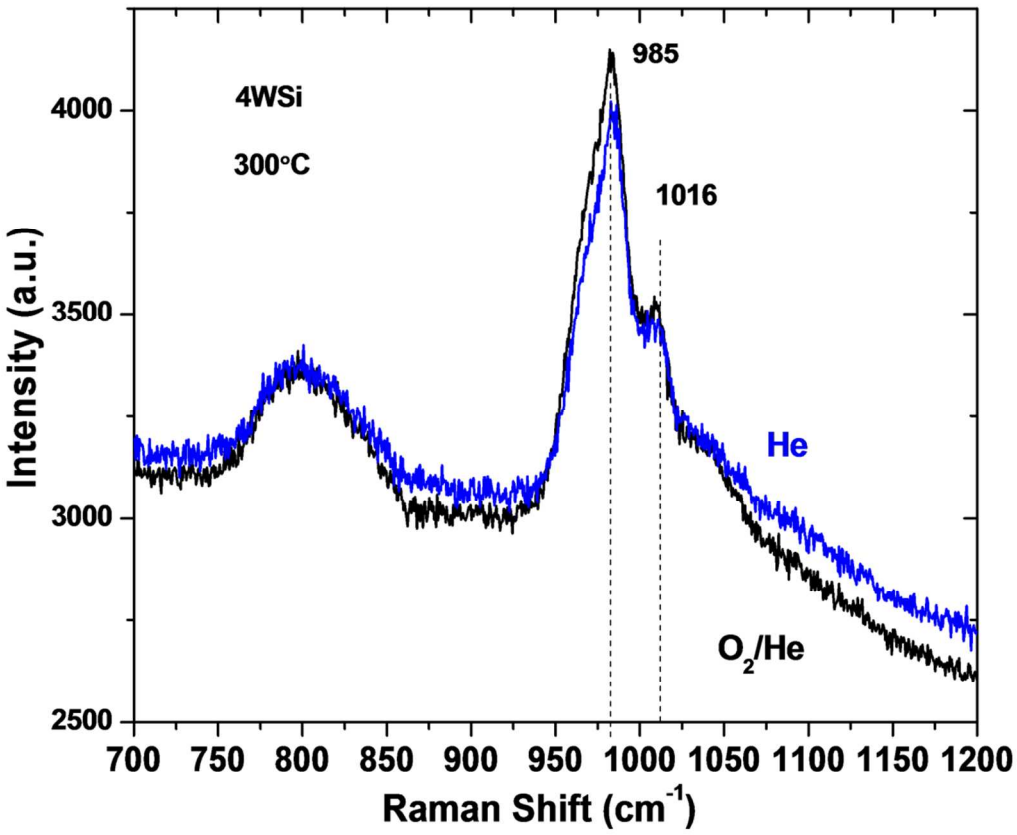

Figure S5. *In situ* Raman spectra of supported 4%WO_x/SiO_2 catalyst at 300°C in flowing O_2/He (30 minutes) or He (30 minutes).

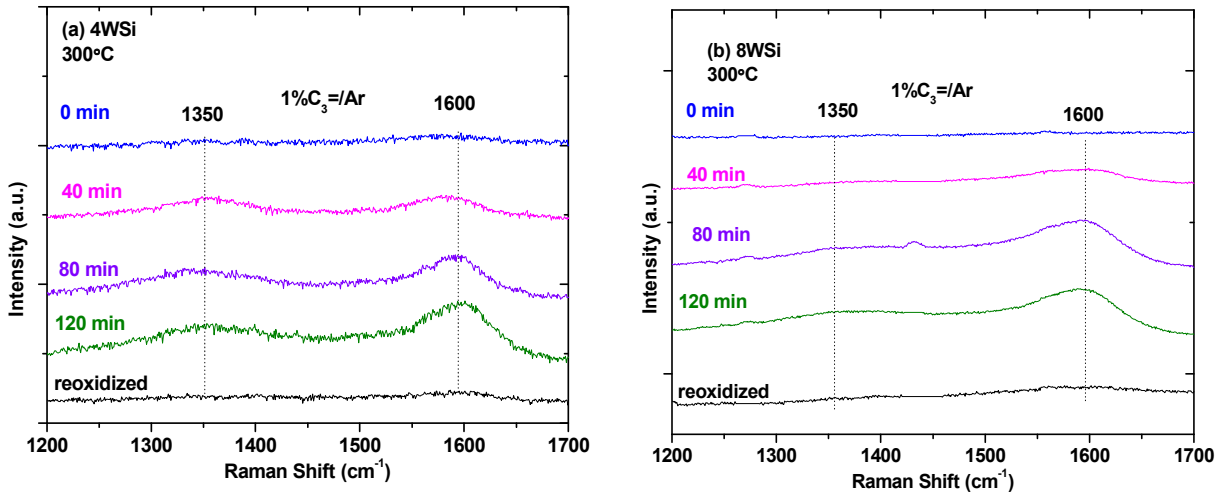

Figure S6. *Operando* Raman spectra for the (a) 4% and (b) 8% catalysts in the 1200-1700 cm^{-1} range showing formation of some coke on the catalysts.

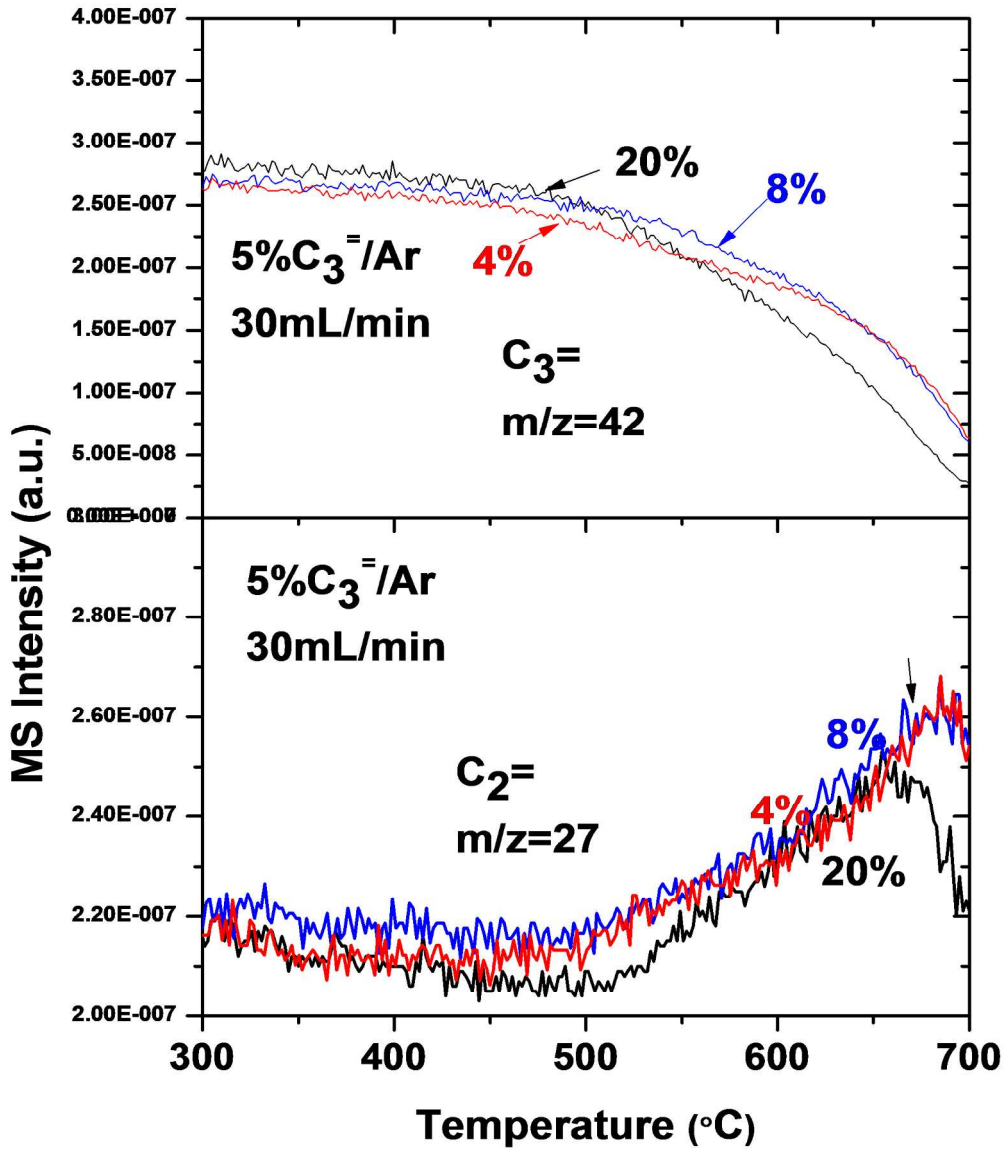

Figure S7. The C_3= and C_2= profiles during C_3=/Ar-TPSR as a function of WO_x loadings (correspond to Figures 9 and 10 in the main text).

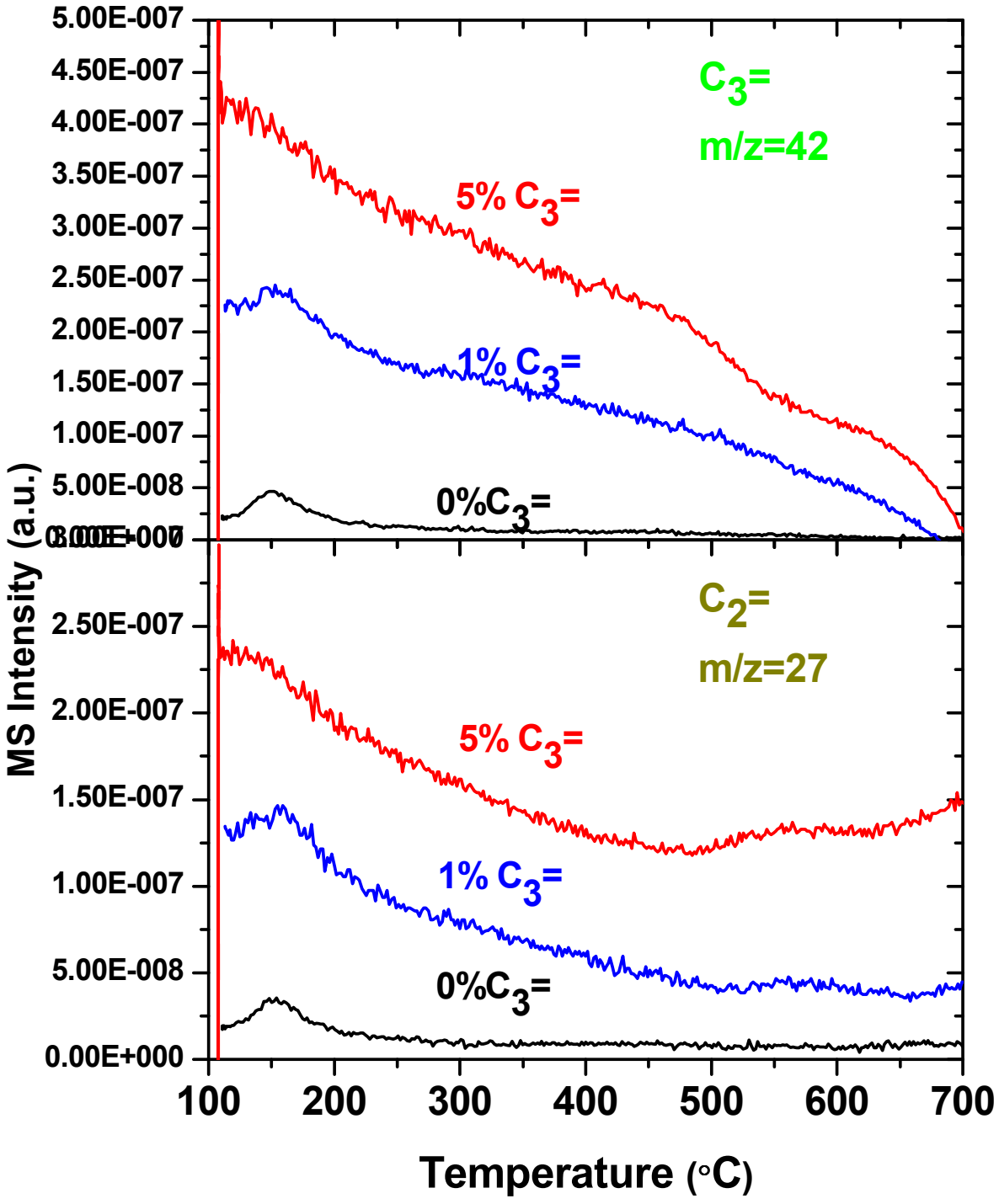

Figure S8. C_3= and C_2= profiles in flowing 0-5% C_3= after 500°C C_3= treatment and 100°C C_3= adsorption