Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Support Information: Supported two- and three-dimensional vanadium oxide species on the surface of β-SiC

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S.1) Set of data to accurately measure:

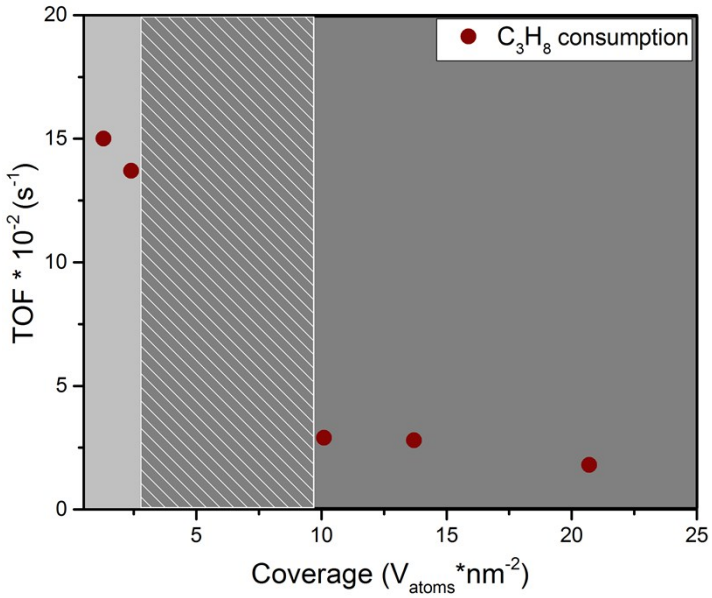
BET surface area (m^2/g)

Sample	BET-I	BET-II	BET-III	Average	STDEV
β-SiC_p	32.1	28.3	29.4	**29.9**	1.6
2V/β-SiC_p	25.6	28.5	25.8	**26.6**	1.3
β-SiC_o	29.3	29.5	29	**29.3**	0.2
1V/β-SiC_o	27.1	26.6	26.2	**26.6**	0.4
2V/β-SiC_o	24.6	26.3	26.8	**25.9**	0.9
4V/β-SiC_o	14.9	12.4	15.8	**14.4**	1.4
6V/β-SiC_o	14.2	14.7	13.7	**14.2**	0.4
8V/β-SiC_o	13.5	11.8	12.9	**12.7**	0.7
10V/β-SiC_o	12.1	10.4	11.9	**11.5**	0.8

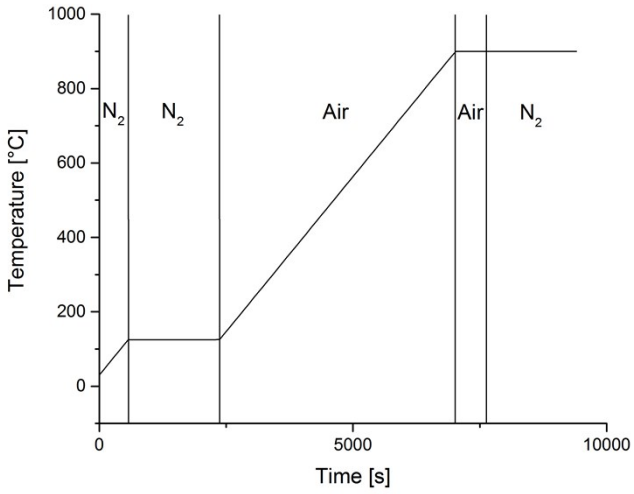
V loading (w.t. %)

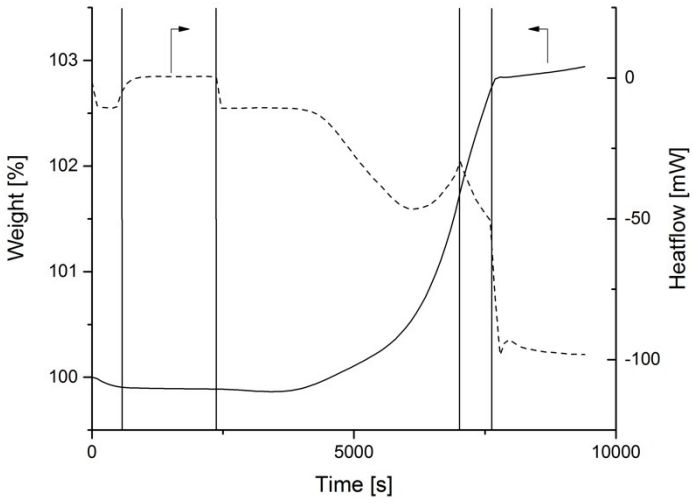
Sample	ICP-I	ICP-II	ICP-III	Average	STDEV
β-SiC_p	-				
2V/β-SiC_p	1.5	2.1	1.9	1.8	0.2
β-SiC_o	-				
1V/β-SiC_o	1.4	0.9	0.7	1.0	0.3
2V/β-SiC_o	1.3	2.1	2.5	2.0	0.5
4V/β-SiC_o	4.1	4.3	4.5	4.3	0.2
6V/β-SiC_o	6.1	6.3	5.4	5.9	0.4
8V/β-SiC_o	7.9	7.8	7.9	7.9	0.1
10V/β-SiC_o	9.6	9.8	10.1	9.8	0.2

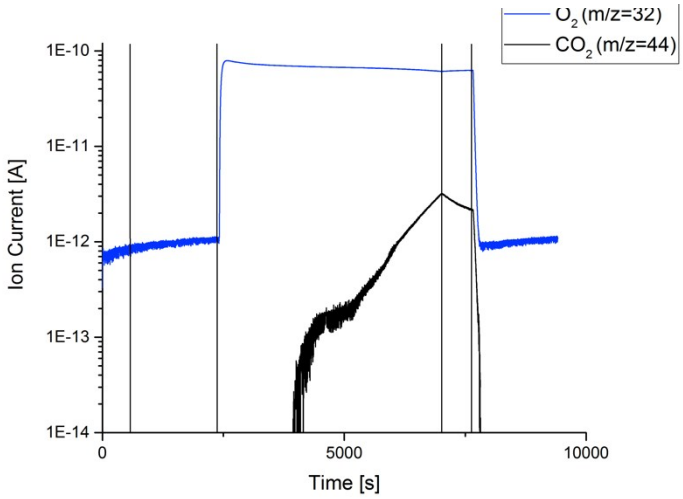
S.2) Turn over frequency (TOF) for propane consumption as a function of V coverage for the studied V/β-SiC_o catalysts at 490 C. $C_3H_8/O_2/N_2$ = 6:3:11 composition. The inverse weight hourly space velocity ($WHSV^{-1}$) was varied between 40-250 $kg_{cat}.s/m^3$.



S.3) The used temperature program (top left), TGA-DSC data (top right), and the MS data for O_2 and CO_2 (bottom left). At around 400 ^{0}C under air, the formation of CO_2 begins and steadily increases. Once air is switched to N2, CO2 production stops. The increase in mass, despite of the formation of CO2, occurs basically because SiC + $2O_2$ -> SiO_2 + CO_2. As the molar mass of SiC is lower than SiO_2, this results in an increase in total mass.

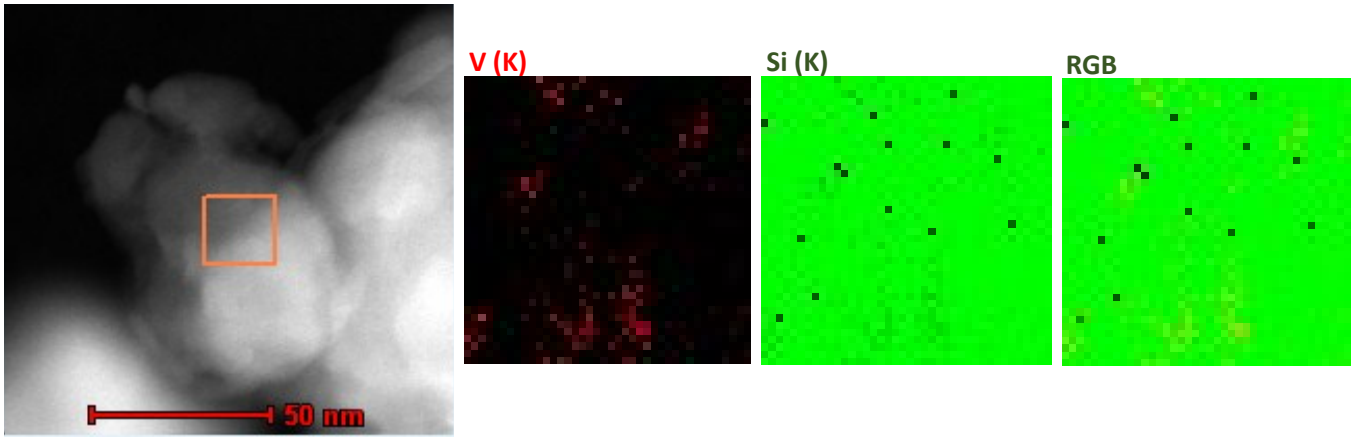


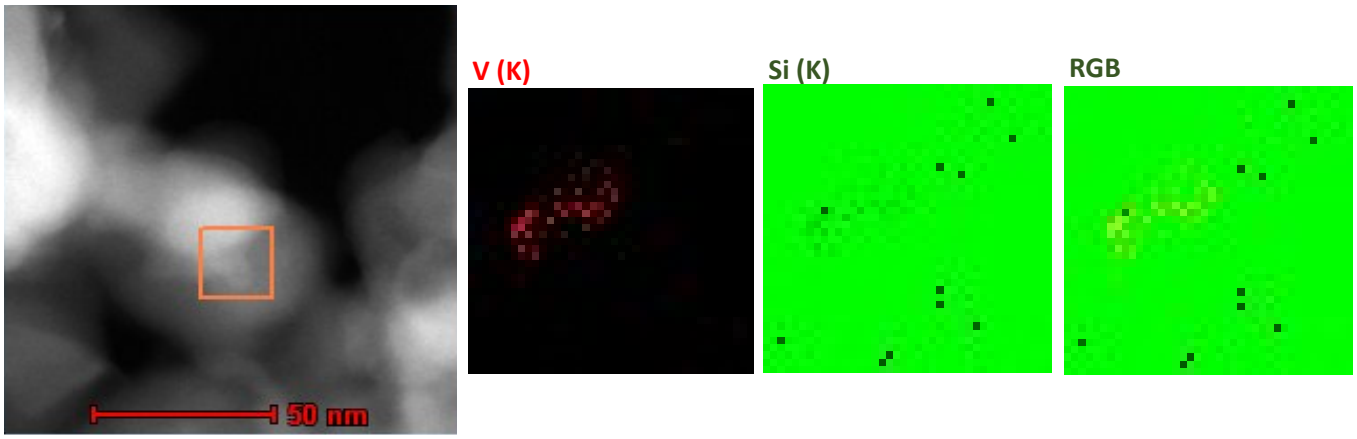




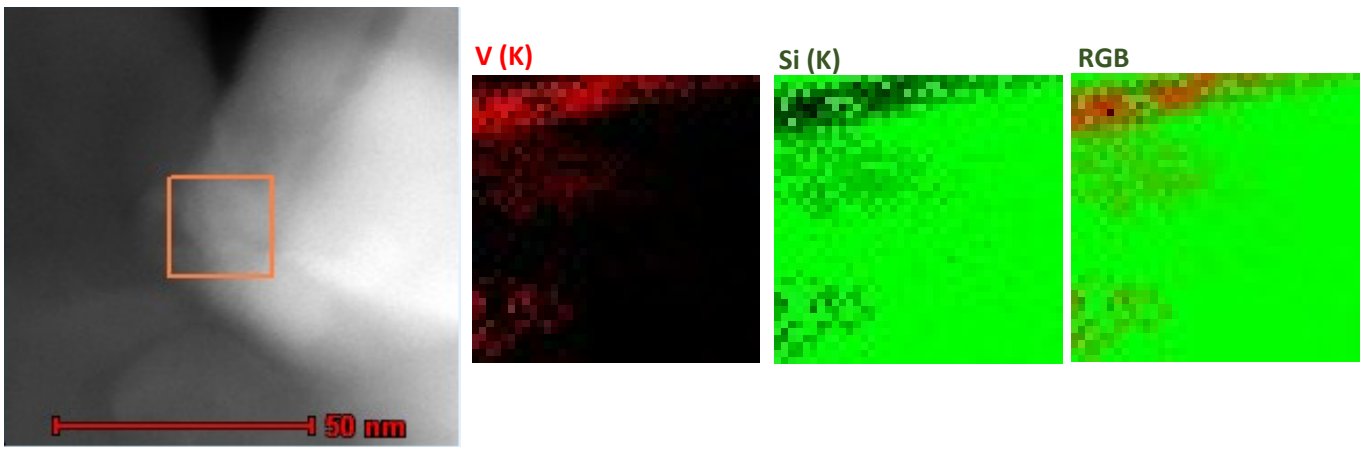
S.4) EDS Analysis for V/β-SiC and V/SiO_2 samples. Whereas the formation of "V-islands" can be observed both at low (2.4 V_{atoms}*nm^{-2}) and high (13.7 V_{atoms}*nm^{-2}) V coverage on β-SiC, a more uniform V distribution is observed on V/SiO_2 samples with similar V coverage.

2V/β-SiC (θ = 2.4 V_{atoms}*nm^{-2})

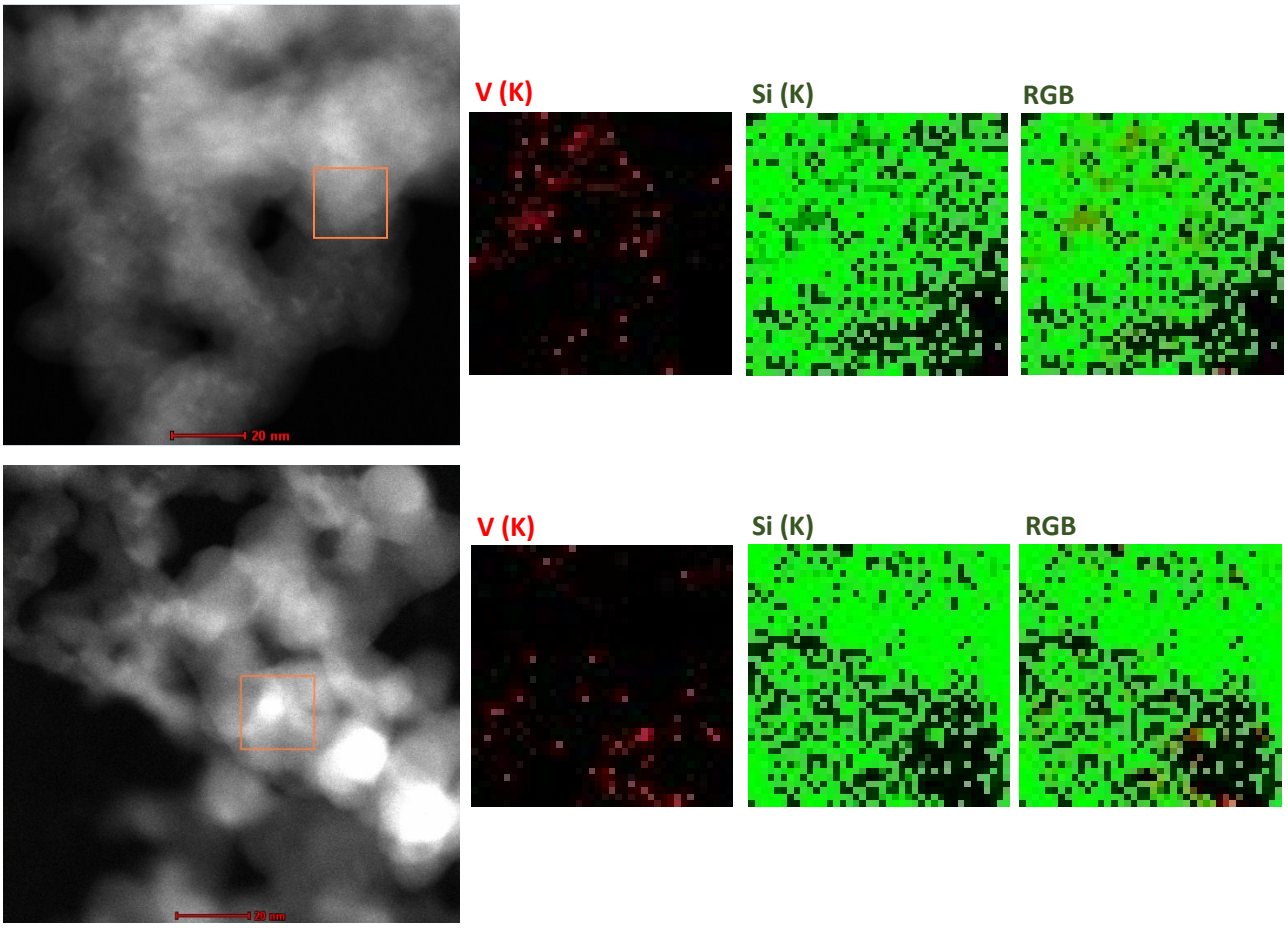




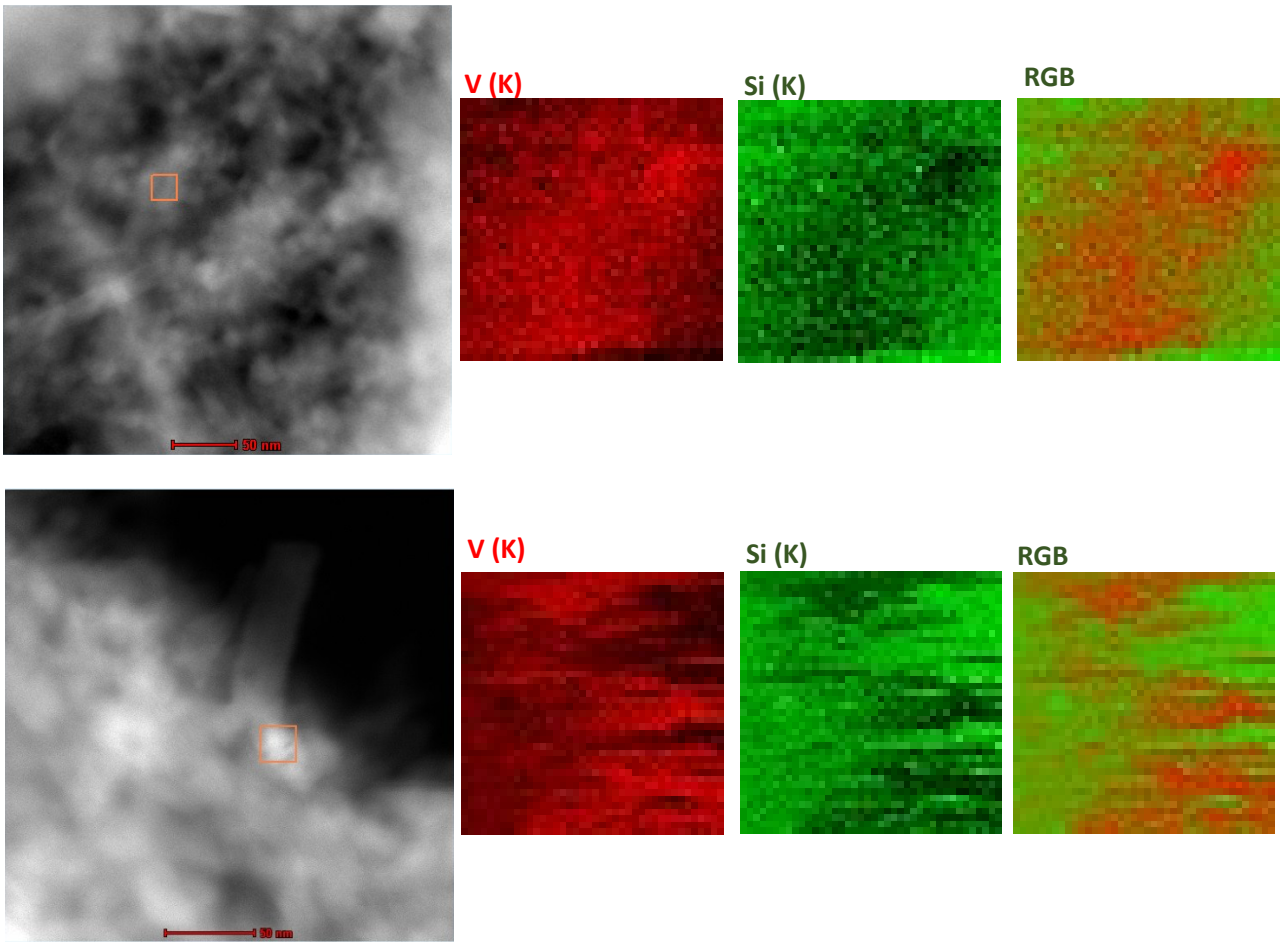
6V/β-SiC (θ = 13.7 V_{atoms}*nm^{-2})



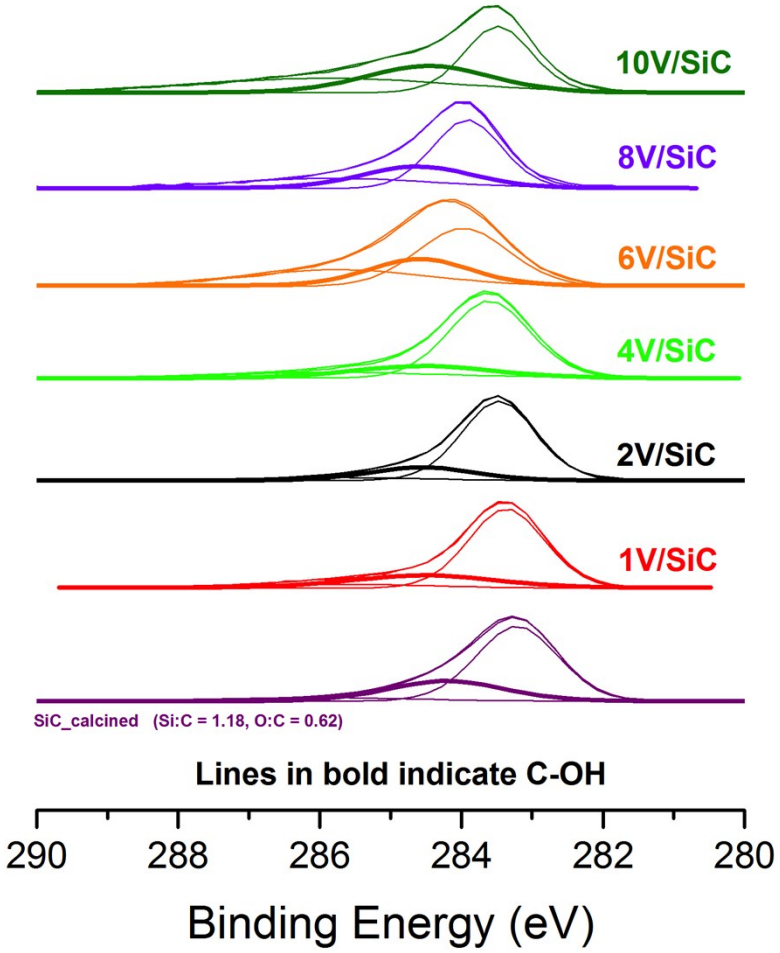
$2V/SiO_2$ (θ = 1.3 $V_{atoms}*nm^{-2}$)

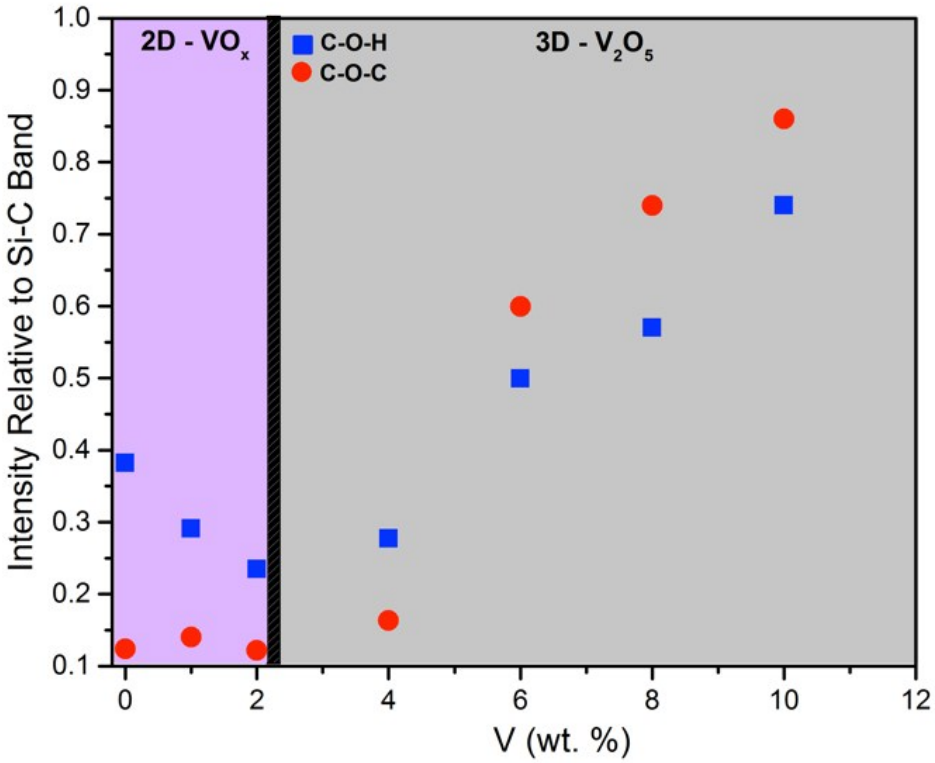


$7V/SiO_2$ (θ = 13.4 $V_{atoms}*nm^{-2}$)



S.5) XPS C1s spectra of β-SiC with various vanadium oxide loading.





S.6) ^{51}V MAS NMR spectra of dehydrated V/β-SiC_o materials containing 1, 2, 4, and 6 wt.% V, with signal intensity scaled to an equivalent number of scans. The 4 and 6 wt.% V/β-SiC_o exhibit a single isotropic shift (denoted by an asterisk, *) at -616 ppm, whereas no signal is observed in the spectra for 1 and 2 wt.% V.