

Carbon balances for catalytic activity experiments.

Table 1. shows the molar flow of methanol at the inlet ($F_{\text{MeOH,in}}$) and the outlet of the reactor ($F_{\text{MeOH,out}}$), the methanol molar flow converted in every experiment against time on stream ($F_{\text{C,converted}}$) and the total molar flow of carbon-containing products in the gases at the outlet ($F_{\text{C,gases}}$). The error has been calculated from the difference between the methanol molar flow converted and the total molar flow of carbonaceous species obtained as expressed in equation [1]. As can be observed, in almost all cases the error is under 5%.

$$\text{Error (\%)} = 100 * (F_{\text{C,converted}} - F_{\text{C,gases}}) / F_{\text{C,converted}} \quad [1]$$

Table 1. Carbon balances for catalytic activity experiments.

Catalyst	T _{Reduction} °C	Time (min)	F _{MeOH,out} (mol/min)	X _{MeOH} %	F _{C,converted} (mol/min)	F _{C,gases} (mol/min)	Error %
Pd/CS-800	400	62	8.0099E-05	85.5	0.00047344	0.00045941	3.0
		98	0.00011326	79.5	0.00044028	0.00043808	0.5
		135	0.00011505	79.2	0.00043848	0.00041795	4.7
		172	0.00012894	76.7	0.0004246	0.00042517	-0.1
		208	0.0001267	77.1	0.00042684	0.0004412	-3.4
	500	58	3.0425E-05	94.5	0.00052311	0.0005447	-4.1
		95	6.8276E-05	87.7	0.00048526	0.0004826	0.5
		131	6.3681E-05	88.5	0.00048986	0.00049337	-0.7
		168	7.3577E-05	86.7	0.00047996	0.00048637	-1.3
		203	7.6658E-05	86.2	0.00047688	0.00045809	3.9
Pd/CS-1000	400	55	0.00033754	39.0	0.000216	0.00021264	1.6
		90	0.00035856	35.2	0.00019498	0.00022269	-14.2
		126	0.00036857	33.4	0.00018497	0.00019092	-3.2
		158	0.00037398	32.4	0.00017956	0.00018915	-5.3
		192	0.00040602	26.7	0.00014752	0.00014815	-0.4
	500	61	0.00016346	70.5	0.00039008	0.00035215	9.7
		98	0.00027206	50.9	0.00028148	0.00027457	2.5
		134	0.00031638	42.8	0.00023716	0.00023167	2.3
		169	0.00033814	38.9	0.0002154	0.00020776	3.5
		204	0.00036383	34.3	0.0001897	0.00019069	-0.5

$F_{\text{MeOH, in}}$ (mol/min): 0.00055354