Modified tables in response to Review 1

Table 1: Selected epoxides used as coating reagentstable

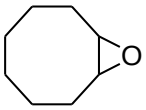
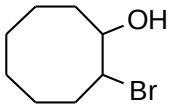
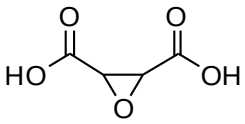
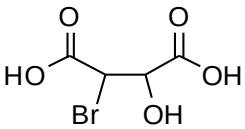
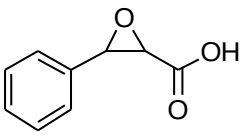
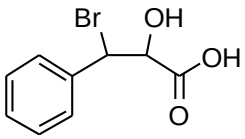
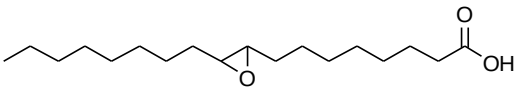
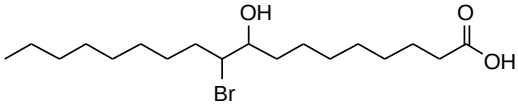
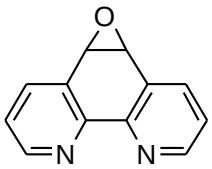
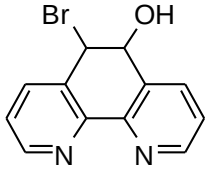
Coating	Derivative	Observations
1,2-epoxycyclooctane 	2-bromocyclooctanol 	Evaporated during sampling
trans-oxirane-2,3-dicarboxylic acid 	2-bromo-3-hydroxy-butanedioic acid 	No product
2,3-epoxy-3-phenylpropanoic acid 	2-bromo-3-hydroxy-3-phenylpropanoic acid 	No product
9,10-epoxystearic acid  	10-bromo-9-hydroxystearic acid	Water and chloride side product: 9,10-dihydroxystearic acid 10-chloro-9-hydroxystearic acid
5,6-epoxy-5,6-dihydro-[1,10]-phenanthroline (EP) 	5-bromo-6-hydroxy-5,6-dihydro-[1,10]-phenanthroline (EPBr) 	Chloride side product: 5-chloro-6-hydroxy-5,6-dihydro-[1,10]-phenanthroline Details are described in section 3.2.

Table 2: Experimental details for the determination of collection efficiency for denuders coated with 7.5 and 15.0 mmol/L EP coating

Experiment (Fig. 1a)	EP-Coating Solution [mmol/L]	EP theoretical on denuder [µmol]	EP concentrated to 100 µL [mmol/L]	Approx. applied gases:		Breakthrough	
				HBr [µmol]	HCl [µmol]	2. denuder [%]	3. denuder [%]
3 denuder in series	7.5	22.5	225	0.2	None	105 ± 5	30 ± 5
3 denuder in series	15.0	45.0	450	0.2	None	0.6 ± 0.4	<0.1
2 denuder in series	15.0	45.0	450	0.2	5	1.9 ± 0.4	-

Table 3: Comparison of simultaneously test gas sampling of EP coated denuders and Raschig Tubes for gaseous HBr determination. The setup is shown in Fig. 1b.

Experiment	Denuder		Raschig	
	Sampled amount of HBr [nmol]	Calculated HBr in sampled test gas [ppb]	Sampled amount of HBr [nmol]	Calculated HBr in sampled test gas [ppb]
1	1.8 ± 0.6	3.6 ± 1.6	26.0 ± 3.6	4.1 ± 0.6
2	2.3 ± 0.7	5.8 ± 2.2	28.1 ± 3.9	5.1 ± 0.7
3	3.0 ± 0.4	7.7 ± 1.2	41.6 ± 5.3	7.4 ± 1.0
4	4.8 ± 0.7	14.4 ± 2.3	83.0 ± 11.7	16.8 ± 2.4
5	7.6 ± 0.7	18.5 ± 1.8	111.7 ± 14.7	17.9 ± 2.4

Table 4: Results of denuder measurements sampled in Masaya's plume on three days in July 2016. Sampling has been performed at three different locations with the following distances to the emission source: Santiago Rim 215 ± 50 m, Nindiri Rim 740 ± 50 m and in the Caldera Valley 2000 ± 150 m (Fig. 3b). Total Bromine has been determined by simultaneously applied Raschig Tubes (details in Rüdiger et al. 2021). HBr concentrations (in ppb) were determined by EP-coated denuders. Their respective LOD and LOQ were calculated based on the signal-to-noise approach using 3- and 10-times the standard deviation of the blank samples (n=3). The Raschig bias is the calculated differences obtained from the line equation of the orthogonal distance regression. The determined amount of HBr (in nmol) is given for comparison with lab experiments.

Date	Total Br* [ppb]	HBr [ppb]	LOD [ppb]	LOQ [ppb]	Raschig bias [ppb]	HBr on denuder [nmol]	HBr/ total Br [%]	Comment
18.07.2016								
Santiago Rim	1.85 ± 0.04	1.65 ± 0.05	0.04	0.12	- 0.13	1.42 ± 0.04	89	
Nindiri Rim	1.31 ± 0.03	0.44 ± 0.03	0.02	0.06	- 0.17	0.38 ± 0.02	34	
20.07.2016								
Santiago Rim	1.55 ± 0.03	1.14 ± 0.05	0.07	0.24	- 0.15	0.92 ± 0.04	74	
Nindiri Rim	1.22 ± 0.03	0.55 ± 0.05	0.09	0.29	- 0.17	0.45 ± 0.04	45	
Caldera Valley	Not available	<LOD <LOD	1.39 1.46	3.99 3.81		0.03 ± 0.01 0.02 ± 0.01		UAV-based sampling
21.07.2016								
Santiago Rim	3.05 ± 0.05	1.97 ± 0.11 1.82 ± 0.10	0.08 0.06	0.27 0.26	- 0.12 - 0.13	1.53 ± 0.09 1.42 ± 0.08	65 60	Simultaneous
Nindiri Rim	1.81 ± 0.04	0.55 ± 0.05	0.05	0.15	- 0.17	0.58 ± 0.05	30	
	2.56 ± 0.06	1.17 ± 0.07	0.07	0.23	- 0.15	0.91 ± 0.05	46	Simultaneous
		0.97 ± 0.09	0.09	0.30	- 0.16	0.75 ± 0.07	38	

* Total Bromine determined by Raschig Tube samples adopted from Rüdiger et al. (2021)

Table S 1: GC-temperature programs

Heating rate [°C min^{-1}]	End temperature [°C]	Holding [min]	Duration [min]
Program A, analysis of 1,2-epoxycyclooctane coated denuders			
	90	3.00	3.00
38	210	0.00	6.16
9.5	235	0.00	8.79
30	250	min. 2	min. 11.29
Program B, analysis of 9,10-epoxystearic acid-coated denuders			
	120	0.50	0.50
38	250	0.00	3.92
10	300	0.00	8.92
program C, analysis of trans-oxirane-2,3-dicarboxylic acid and 3-Phenyloxirane-2-carboxylic acid coated denuders.			
	90	3.00	3.00
18	150	3.00	9.33
25	250	17.00	30.33