

Table R1 A summary of the main peaks of adsorbed N<sub>2</sub>O<sub>4</sub> reported in earlier studies

No.	Reference	Surface	Adsorbed N <sub>2</sub> O <sub>4</sub> (cm <sup>-1</sup> )
(1)	Ma et al., J. Phys. Chem. A 2008, 112, 6630.	$\gamma$ -Al <sub>2</sub> O <sub>3</sub>	1733 $\nu_a(\text{NO}_2)$
(2)	Goodman et al., J. Phys. Chem. A 1999, 103, 7217.	hydrated Silica	1744 broad peak
(3)	Barney et al., J. Phys. Chem. A 2000, 104,171.	porous glass	1740 broad peak
(4)	Wang and Koel, J. Phys. Chem. A 1998, 102, 8573.	Au(111)	1760 $\nu_a(\text{NO}_2)$ , 1735 $\nu_a(\text{NO}_2)$
(5)	Koch et al., J. Phys. Chem. 1995, 99, 8362.	gold foil	1761 $\nu_a(\text{NO}_2)$ 1734 $\nu_a(\text{NO}_2)$
(6)	Mochida et al., J. Phys. Chem. A 2000, 104, 9705.	porous glass	1750 broad peak
(7)	Liu et al., Phys. Chem. Chem. Phys., 2012, 14, 1668.	mineral oxides	1749 broad peak
(8)	Finlayson-Pitts et al., Phys. Chem. Chem. Phys., 2003, 5, 223.	glass	1740 broad peak
(9)	Givan, A.; Loewenschuss, A. J. Chem. Phys. 1989, 90, 6135.	copper or gold coated copper plate	1750 $\nu_a(\text{NO}_2)$ , 1728 $\nu_a(\text{NO}_2)$

Table R2 Slopes obtained using different reaction times as initial stages

Reaction time	120 min	100 min	80 min	60 min	40 min
slope	0.1731	0.1773	0.1788	0.1758	0.1658
R <sup>2</sup>	0.997	0.997	0.995	0.991	0.975

**Table 2.** Sulfate formation rates and uptake coefficients for heterogeneous reactions of SO<sub>2</sub> on hematite and the hematite-nitrate mixtures at 298 K.

NaNO <sub>3</sub> (%)	A <sub>BET</sub> (m <sup>2</sup> /g)	Sulfate formation rate (ions s <sup>-1</sup> ) (×10 <sup>15</sup> )	A <sub>geometric</sub> (m <sup>2</sup> ) (×10 <sup>5</sup> )	γ <sub>BET</sub> (×10 <sup>7</sup> )	γ <sub>geometric</sub> (×10 <sup>3</sup> )
0	12.1	1.28±0.07	7.85	5.58±0.29	2.58±0.14
2	11.8	1.48±0.15	7.85	6.60±0.69	2.98±0.31
4	11.7	2.01±0.12	7.85	9.04±0.56	4.04±0.25
6	11.5	3.62±0.18	7.85	16.6±0.81	7.29±0.35
12	10.9	4.93±0.29	7.85	23.8±0.14	9.93±0.58
24	9.1	7.11±1.34	7.85	41.2±0.78	14.3±2.69
48	5.2	4.39±0.39	7.85	44.5±0.39	8.84±0.78
60	4.0	1.62±0.25	7.85	21.3±0.32	3.25±0.49
72	2.8	0.59±0.15	7.85	11.2±0.29	1.19±0.31
90	1.3	0.15±0.03	7.85	6.10±1.05	0.30±0.05
100		0		0	0