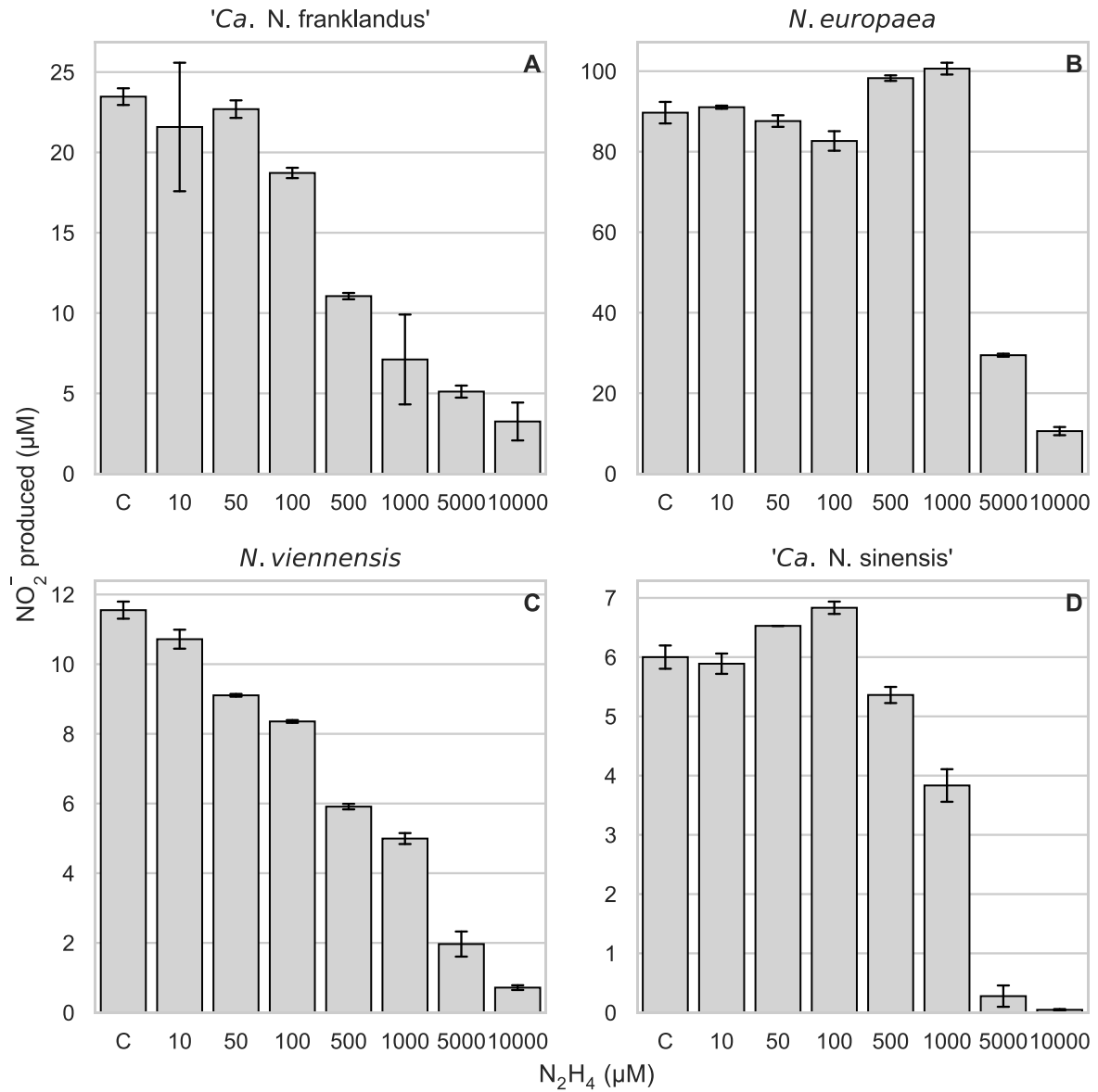


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Supplemental Figure 1. NO_2^- production after 1 h incubation with different concentrations of phenylhydrazine using 100 μM NH_2OH as substrate for *N. europaea* and 'Ca. Nitrosotalea sinensis' and 200 μM for 'Ca. Nitrosocosmicus franklandus' and *N. viennensis*. NO_2^- was measured 1 h after addition of the substrate. Error bars represent standard deviation (n = 3).

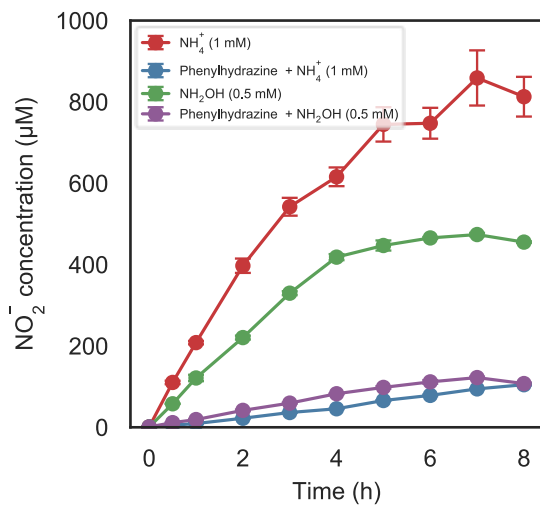


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10 Supplemental Figure 2. NO_2^- production after 1 h incubation with different concentrations of
 11 N_2H_4 using 100 μM NH_2OH as substrate for *N. europaea* and 'Ca. Nitrosotalea sinensis' and
 12 200 μM for 'Ca. Nitrosocosmicus franklandus' and *N. viennensis*. NO_2^- was measured 1 h after
 13 addition of the substrate. Error bars represent standard deviation (n = 3).

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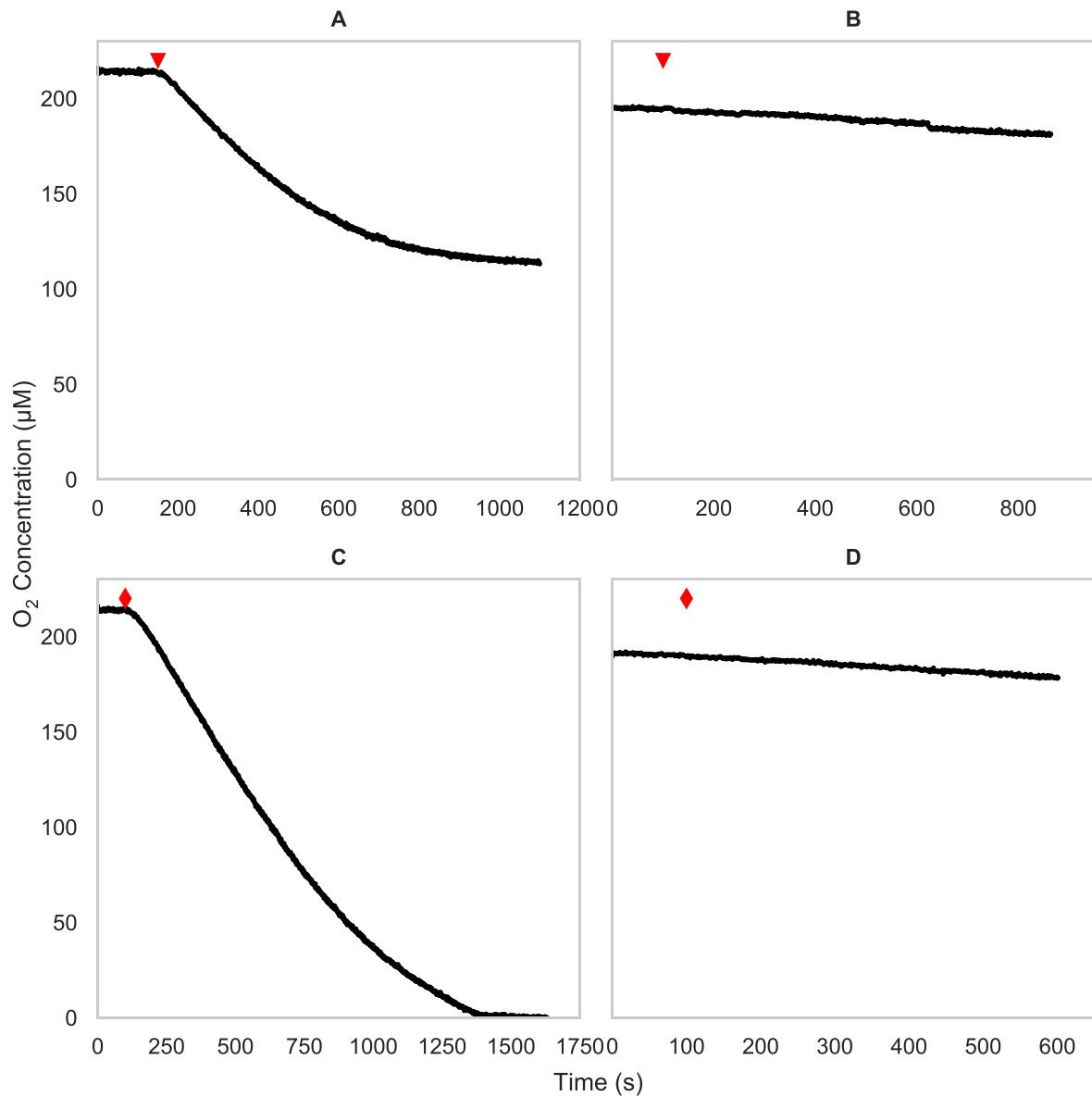
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17 Supplemental Figure 3 – Time course of the recovery of NO₂⁻ production in *N. europaea* with

18 1 mM NH₄⁺ or 0.5 mM NH₂OH as substrate after removal of 100 µM phenylhydrazine by

19 washing. Error bars represent the standard deviation (n = 3).

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23 Supplemental Figure 4 – Oxygen uptake measurements by cell suspensions of *N. europaea*.

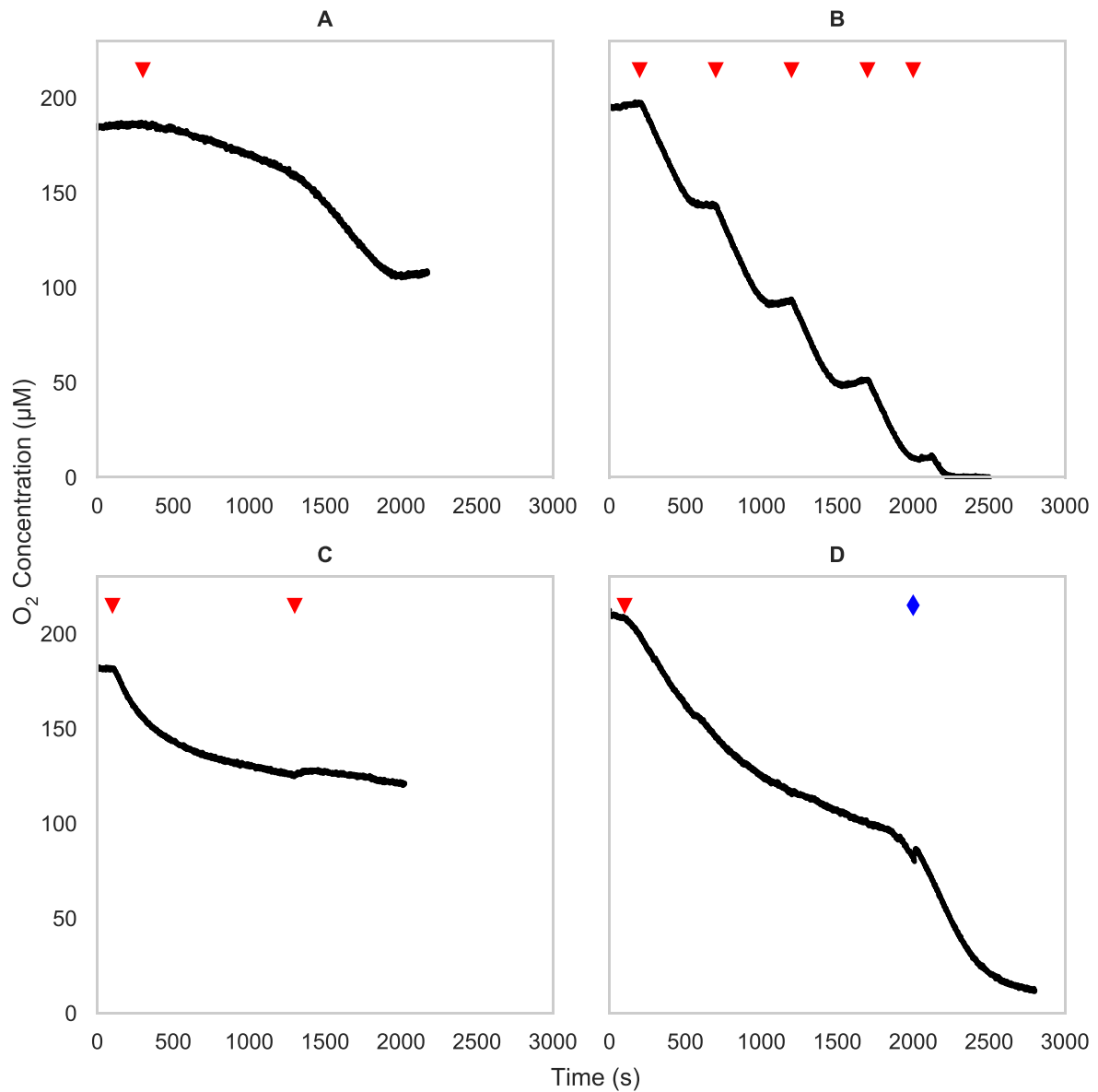
24 Concentrations of 100 μM NH₂OH (A and B, red triangles) or 600 μM N₂H₄ (C and D, red

25 diamonds) were added. Control cells (A and C) are compared to cells incubated with 100 μM

26 phenylhydrazine (B and D). Experiments were performed at least three times with similar

27 results.

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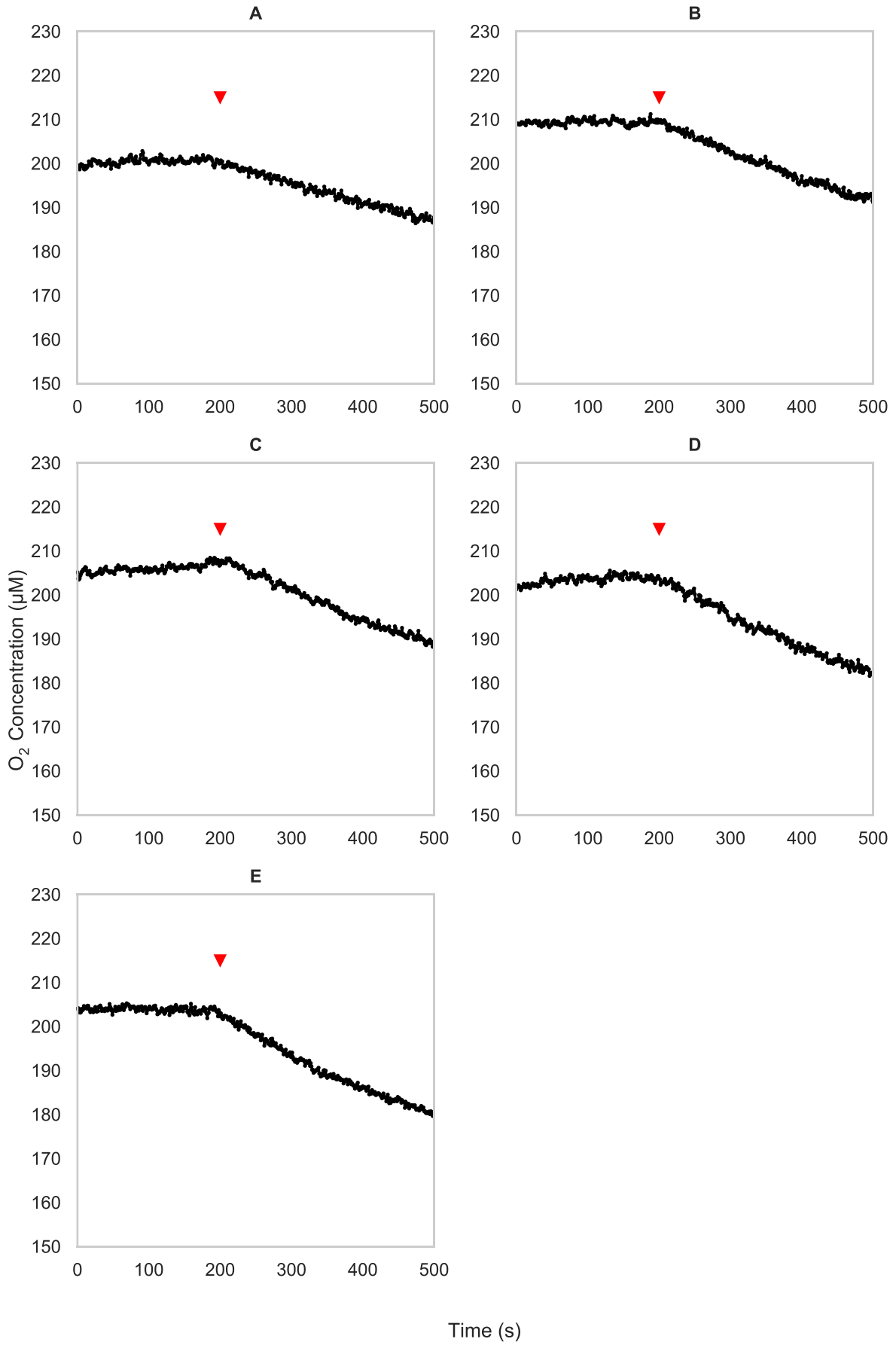
31 Supplemental Figure 5 – Oxygen uptake measurements by cell suspensions of ‘*Ca.*

32 *Nitrosocosmicus franklandus*’. A: addition of 400 µM NH₂OH (red triangle); B: repeated

33 spiking with 200 µM NH₂OH (red triangles) until anoxic; C: spiking with 600 µM N₂H₄ (red

34 triangles); D: addition of 600 µM N₂H₄ (red triangle) followed by 500 µM NH₄⁺ (blue diamond).

35



37 Supplemental Figure 6 – Initial rates of oxygen consumption in cell suspensions of '*Ca.*
38 *Nitrosocosmicus franklandus*' after addition of different concentrations of N_2H_4 (red
39 triangles). A: 200 μM N_2H_4 ; B: 400 μM N_2H_4 ; C: 600 μM ; N_2H_4 ; D: 800 μM ; N_2H_4 ; E: 1000 μM
40 N_2H_4 .

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Supplementary Table 1. Experimental design for the end-point inhibition assays

Organism	Ammonia (μM)	Hydroxylamine (μM)	Hydrazine (μM)	Phenylhydrazine (μM)	Results shown
' <i>Ca. Nitrosocosmicus franklandus</i> C13'	100	-	-	0.05-500	Figure 1
	-	200	-	0.05-500	Figure S1
	100	-	1-10,000	-	Figure 2
	-	200	1-10,000	-	Figure S2
<i>Nitrosomonas europaea</i>	100	-	-	0.05-500	Figure 1
	-	100	-	0.05-500	Figure S1
	100	-	1-10,000	-	Figure 2
	-	100	1-10,000	-	Figure S2
<i>Nitrososphaera viennensis</i> EN76	100	-	-	0.05-500	Figure 1
	-	200	-	0.05-500	Figure S1
	100	-	1-10,000	-	Figure 2
	-	200	1-10,000	-	Figure S2
' <i>Ca. Nitrosotalea sinensis</i> Nd2'	100	-	-	0.05-500	Figure 1
	-	100	-	0.05-500	Figure S1
	100	-	1-10,000	-	Figure 2
	-	100	1-10,000	-	Figure S2

Supplementary Table 2. Experimental design for the oxygen uptake experiments					
Organism	Ammonia (μM)	Hydroxylamine (μM)	Hydrazine (μM)	Phenylhydrazine (μM)	Results shown
<i>'Ca. Nitrosocosmicus franklandus C13'</i>	-	200	-	-	Figure 4A
	-	200	-	100	Figure 4B
	-	-	600	-	Figure 4C
	-	-	600	100	Figure 4D
	-	400	-	-	Figure S5A
	-	5 x 200	-	-	Figure S5B
	-	-	2 x 600	-	Figure S5C
	500	-	600	-	Figure S5D
	-	-	200-1,000	-	Figure S6
<i>Nitrosomonas europaea</i>	-	100	-	-	Figure S4A
	-	100	-	100	Figure S4B
	-	-	600	-	Figure S4C
	-	-	600	100	Figure S4D