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Supplementary Information

Progress and Challenges on Nitrous Oxide Decomposition and Valorization

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Table S1. Summary of representative studies on technologies for N_2O elimination.

Reaction type	Catalyst	Reaction conduction	Reaction activity	Ref.
deN_2O	(5 wt.%) Ir/ZrO_2	200 ppm N_2O, 10% O_2, N_2 balance at 100 $cm^3 \cdot min^{-1}$ and W/F = 5.0 × 10^{-4} $g \cdot min \cdot cm^{-3}$	T_{50} = 329 ºC	S. Hinokuma, T. Iwasa, Y. Kon, T. Taketsugu and K. Sato, *Catal. Commun.*, 2021, **149**, 106208..
deN_2O	Ir/Al_2O_3	1000 ppm N_2O balanced with He, total flow rate of 150 cm^{-3} min^{-1}, WHSV of 180,000 cm^3 g^{-1} h^{-1}	T_{100} ≈ 480 ºC	I. V. Yentekakis, G. Goula, P. Panagiotopoulou, S. Kampouri, M. J. Taylor, G. Kyriakou and R. M. Lambert, *Appl. Catal., B-Environ.*, 2016, **192**, 357-364.
deN_2O	(0.5 wt.%) Ir/CeO_2-Al_2O_3	1000 ppm N_2O balanced with He, GHSV of 40000 h^{-1}	T_{100} = 600 ºC	E. Pachatouridou, E. Papista, A. Delimitis, M. A. Vasiliades, A. M. Efstathiou, M. D. Amiridis, O. S. Alexeev, D. Bloom, G. E. Marnellos, M. Konsolakis and E. Iliopoulou, *Appl. Catal., B-Environ.*, 2016, **187**, 259-268.
deN_2O	(5 wt.%) Ir/TiO_2–Al_2O_3	30 vol.% N_2O in Ar, GHSV of 30, 000 ml h^{-1} g_{cat}^{-1}	T_{100} = 350 ºC	S. Liu, Y. Cong, Y. Huang, X. Zhao and T. Zhang, *Catal. Today*, 2011, **175**, 264-270.
deN_2O	(2.6 wt.%) Pd/γAl_2O_3	1% N_2O balanced with He, total flow rate of 100 mL min^{-1}, GHSV of 76 690 h^{-1}	r_{N2O} = 10.3 mol_{N2O} h_{-1} kg_{cat}^{-1} at 550 ºC	N. Richards, J. H. Carter, E. Nowicka, L. A. Parker, S. Pattisson, Q. He, N. F. Dummer, S. Golunski and G. J. Hutchings, *Appl. Catal., B-Environ.*, 2020, **264**, 118501.
deN_2O	(1 wt.%) Pd/$LaCoO_3$	1000 ppm N_2O balanced with He, total flow rate of 15 L h^{-1}, GHSV of 10 000 h^{-1}	T_{50} = 433 ºC	J. Dacquin, C. Dujardin and P. Granger, *J. Catal.*, 2008, **253**, 37-49.
deN_2O	Rh/CeO_2	200 ppm N_2O, 5% CO_2 balanced with Ar, WHSV of 100000 mL g^{-1} h^{-1}	T_{100} = 450 ºC	S. Xie, D. Kim, K. Ye, L. Tetard and F. Liu, *J. Rare Earth.*, 2023, **41**, 941-951.
deN_2O	Rh/CeO_2	200 ppm N_2O balanced with N_2, GHSV of 30 000 h^{-1}	98% N_2O conversion at 400 ºC	Y. Li, A. Sundermann, O. Gerlach, K.-B. Low, C. C. Zhang, X. Zheng, H. Zhu and S. Axnanda, *Catal. Today*, 2020, **355**, 608-619.
deN_2O	Aged Rh/CeO_2	200 ppm N_2O balanced with N_2, WHSV of 250,000 cm^3 g^{-1} h^{-1}	92% N_2O conversion at 400 ºC	H. Zhu, Y. Li and X. Zheng, *Appl. Catal. A-Gen.*, 2019, **571**, 89-95.
deN_2O	(5 wt.%) RhO_x/ZrO_2	1000 ppm N_2O, 10% O_2, 2% H_2O balanced with He, total flow rate of 100 mL min^{-1}	r_{N2O} = 2.40 mmol g^{-1} h^{-1} at 350 ºC	Y. Jing, K. Taketoshi, N. Zhang, C. He, T. Toyao, Z. Maeno, T. Ohori, N. Ishikawa and K.-i. Shimizu, *ACS Catal.*, 2022, **12**, 6325-6333.
deN_2O	Rh/Ce-ZrO_2	500 ppm N_2O in N_2, GHSV = 45000 h^{-1}	66.1% N_2O conversion at 225 ºC T_{100} ≈ 300 ºC	M.-J. Kim, H. J. Kim, S.-J. Lee, I.-S. Ryu, H. C. Yoon, K. B. Lee and S. G. *Jeon, Catal. Commun.*, 2019, **130**, 105764.
deN_2O	Rh/CeZrOx	2200 ppm N_2O balanced with He, total	T_{100} = 450 ºC	C. Moreau, Á. Caravaca, P. Vernoux and

		flow rate of 10 L h^{-1}		S. Gil, *ChemCatChem*, 2020, **12**, 3042-3049.
deN_2O	Ru/Al_2O_3	500 ppm N_2O, GHSV of 11000 h^{-1}	T_{100} = 450 °C	Sui, F. Yuan, Z. Zhang, C. Zhang, X. Niu and Y. Zhu, *Catalysts*, 2016, **6**, 173.
deN_2O	RhO_x/Ag/Al_2O_3	0.1% N_2O balanced with He, total flow rate of 100 mL min^{-1}	T_{100} = 400 °C	Y. Jing, C. He, N. Zhang, Y. Murano, R. Toyoshima, H. Kondoh, Y. Kageyama, H. Inomata, T. Toyao and K.-i. Shimizu, *ACS Catal.*, 2023, **13**, 12983-12993.
deN_2O	(1 wt.%) Rh/Zn–Al_2O_3-800	0.5% N_2O balanced with He, total flow rate of 60 mL min^{-1}	T_{50} = 251 °C	C. Huang, Z. Ma, C. Miao, Y. Yue, W. Hua and Z. Gao, *RSC Adv.*, 2017, **7**, 4243-4252.
deN_2O	(1 wt.%) Rh/$La_{10}Si_{6-x}Fe_xO_{27-\delta}$	0.5 vol.% N_2O balanced with He	T_{100} = 600 °C	N. Nunotani, R. Nagai and N. Imanaka, *Catal. Commun.*, 2016, **87**, 53-56.
deN_2O	(3.1 wt.%) RhOx/Ca–P–O	0.5 vol.% N_2O balanced with He, flow rate of 60 mL min^{-1}	T_{100} = 300 °C	Y. Lin, T. Meng and Z. Ma, *J. Ind. Eng. Chem.*, 2015, **28**, 138-146.
deN_2O	(1 wt.%) Rh/Al-KIT-6	1700 ppm N_2O balanced with He, flow rate of 100 mL min^{-1}, GHSV = 26500 h^{-1}	T_{50} = 350 °C, T_{90} = 375 °C	M. Hussain, D. Fino and N. Russo, *Chem. Eng. J.*, 2014, **238**, 198-205.
deN_2O	Rh/Mg/Al	1000 ppm N_2O balanced with N_2, GHSV of 6800 h^{-1}	T_{100} = 400 °C	P. H. Ho, M. Jabłońska, R. Palkovits, E. Rodríguez-Castellón, F. Ospitali, G. Fornasari, A. Vaccari and P. Benito, *Chem. Eng. J.*, 2020, **379**, 122259.
deN_2O	Fe@Rh/ SBA-15	10% N_2O, GHSV =5625 h^{-1}	T_{100} = 400 °C	H. Chen, Q. Lu, C. Yi, B. Yang and S. Qi, *Phys. Chem. Chem. Phys.*, 2018, **20**, 5103-5111.
deN_2O	Au/Fe_2O_3	1000 ppm N_2O balanced with He, total gas flow rate of 150 cm^3 min^{-1}, GHSV = 40 000 h^{-1}	r_{N2O} = 185 nmol m^{-2} s^{-1} at 700 ◦C	S. A. C. Carabineiro, E. Papista, G. E. Marnellos, P. B. Tavares, F. J. Maldonado-Hódar and M. Konsolakis, *Mol. Catal.*, 2017, **436**, 78-89.
deN_2O	RuO_2	1.5 mbar N_2O in He, total gas flow of 50 ml STP min^{-1}	T_{100} = 450 °C	M. Santiago, V. A. Kondratenko, E. V. Kondratenko, N. López and J. Pérez-Ramírez, *Appl. Catal., B-Environ.*, 2011, **110**, 33-39.
deN_2O	Ru/Al_2O_3	500 ppm N_2O, GHSV of 11 000 h^{-1}	T_{100} = 450 °C	C. Sui, F. Yuan, Z. Zhang, C. Zhang, X. Niu and Y. Zhu, *Catalysts*, 2016, **6**, 173.
deN_2O	(1 wt.%) RuOx/Ca–P–O	0.5 vol.% N_2O balanced with He, total gas flow rate of 60 mL min^{-1}	T_{100} = 400 °C	Y. Cui, H. Liu, Y. Lin and Z. Ma, *J. Taiwan Inst. Chem. E.*, 2016, **67**, 254-262.
deN_2O	RuO_2/r-TiO_2	30 vol.% N_2O balanced with Ar, WHSV = 30 000 mL g_{cat}^{-1} h^{-1}	r_{N2O} = 2.30 mol min^{-1} mol_{RuO2}^{-1} at 220 °C	Q. Lin, Y. Huang, Y. Wang, L. Li, X. Y. Liu, F. Lv, A. Wang, W.-C. Li and T. Zhang, *J. Mater. Chem. A*, 2014, **2**, 5178-5181.
deN_2O	Ag/Yb_2O_3	1400 ppm N_2O, 900 ppm NO, total gas flow rate of 4–6 Ndm^3 h^{-1}	83% N_2O conversion at 500 °C	M. Konkol, M. Kondracka, P. Kowalik, W. Próchniak, K. Michalska, A. Schwedt, C. Merkens and U. Englert, *Appl. Catal., B-*

				Environ., 2016, **190**, 85-92.
deN$_2$O	Pt-K/SiO$_2$	2000 ppm of N$_2$O balanced with He,, GHSV = 15 000 h^{-1}	71% N$_2$O conversion at 600 ^{o}C	B. Bozorgi, J. Karimi-Sabet and P. Khadiv-Parsi, *Environ. Technol. Inno.*, 2022, **26**, 102344.
deN$_2$O	Pt$_1$/MgAl$_{1.2}$Fe$_{0.8}$O$_4$	1000 ppm N$_2$O balanced with Ar, total gas flow rate of 33.3 mL min^{-1}	T$_{100}$ = 600 ^{o}C	K. Liu, Y. Tang, Z. Yu, B. Ge, G. Ren, Y. Ren, Y. Su, J. Zhang, X. Sun, Z. Chen, X. Liu, B. Qiao, W.-Z. Li, A. Wang and J. Li, *Sci. China Mater.*, 2020, **63**, 949-958.
deN$_2$O	Co$_3$O$_4$	5% N$_2$O in He, total flow rate of 30 mL min^{-1}	T$_{50}$ = 320 ^{o}C	P. Stelmachowski, K. Ciura and G. Grzybek, *Catal. Sci. Technol.*, 2016, **6**, 5554-5560.
deN$_2$O	Co$_3$O$_4$	5% N$_2$O in He, total flow rate of 30 mL min^{-1}	T$_{50}$ ≈ 375 ^{o}C	P. Stelmachowski, K. Ciura and G. Grzybek, *Catal. Sci. Technol.*, 2016, **6**, 5554-5560.
deN$_2$O	Co$_3$O$_4$	5% N$_2$O in He, total flow rate of 30 mL min^{-1}	T$_{50}$ ≈ 360 ^{o}C	P. Stelmachowski, K. Ciura and G. Grzybek, *Catal. Sci. Technol.*, 2016, **6**, 5554-5560.
deN$_2$O	Co$_3$O$_4$	0.1 mol % N$_2$O in N$_2$, total flow rate of 100 mL min^{-1}, WHSV = 60 m^3 kg^{-1} h^{-1}	80% N$_2$O conversion at 450 ^{o}C	A. Klegova, A. Inayat, P. Indyka, J. Gryboś, Z. Sojka, K. Pacultová, W. Schwieger, A. Volodarskaja, P. Kuśtrowski, A. Rokicińska, D. Fridrichová and L. Obalová, *Appl. Catal., B-Environ.*, 2019, **255**, 117745.
deN$_2$O	Co$_3$O$_4$	1000 ppm N$_2$O balanced with Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	T$_{50}$ = 460 ^{o}C, T$_{90}$ = 520 ^{o}C	X. Hu, Y. Wang, R. Wu and Y. Zhao, *Mol. Catal.*, 2021, **509**, 111656.
deN$_2$O	Co$_3$O$_4$	0.65 vol % N$_2$O, 0.88 vol % O$_2$, and N$_2$ balance, GHSV of 55,000 h^{-1}	T$_{10}$ = 378 ^{o}C, T$_{90}$ = 533 ^{o}C	J. Sun, A. Song, Y. Tian, H. Zhan, J. Deng, H. Wang and M. Ke, *ChemCatChem*, 2023, **15**, 1-10.
deN$_2$O	Co$_3$O$_4$	1000 ppm N$_2$O balanced with Ar, GHSV = 10000 h^{-1}	T$_{50}$ = 310 ^{o}C, T$_{100}$ = 380 ^{o}C	Y. Wang, X. Hu, K. Zheng, X. Wei and Y. Zhao, *Catal. Commun.*, 2018, **111**, 70-74.
deN$_2$O	Co$_3$O$_4$	1000 ppm N$_2$O balanced with Ar, GHSV = 10000 h^{-1}	T$_{100}$ = 400 ^{o}C	Y. Wang, K. Zheng, X. Hu, W. Zhou, X. Wei and Y. Zhao, *Mol. Catal.*, 2019, **470**, 104-111.
deN$_2$O	3.0F-Co$_3$O$_4$	2000 ppmv N$_2$O/Ar (with 5 vol % O$_2$, 100 ppmv NO and 2 vol% H$_2$O), GHSV = 20,000 h^{-1}	T$_{90}$ = 371 ^{o}C no impurity gas; T$_{90}$ = 433 ^{o}C	H. Yu, X. Qi, X. Du, Y. Pan, X. Feng, W. Shan and Y. Xiong, *Mol. Catal.*, 2023, **537**, 112960.
deN$_2$O	N-Co$_3$O$_4$	1000 ppm N$_2$O in Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	T$_{50}$ = 320 ^{o}C, T$_{90}$ = 360 ^{o}C	X. Hu, Y. Wang, R. Wu and Y. Zhao, *Mol. Catal.*, 2021, **509**, 111656.
deN$_2$O	Pr$_{0.06}$-Doped Co$_3$O$_4$	2000 ppm N$_2$O, GHSV = 60 000 mL·g^{-1}·h^{-1}	T$_{50}$ = 320 ^{o}C, T$_{90}$ = 367 ^{o}C	H. Liu, S. Yang, G. Wang, H. Liu, Y. Peng, C. Sun, J. Li and J. Chen, *Environ. Sci. Technol.*, 2022, **56**, 16325-16335.
deN$_2$O	Na-Co$_3$O$_4$	0.65 vol % N$_2$O, 0.88 vol % O$_2$, and	T$_{10}$ = 322 ^{o}C	J. Sun, A. Song, Y. Tian, H. Zhan, J.

		N_2 balance, GHSV = 55,000 h^{-1}		Deng, H. Wang and M. Ke, *ChemCatChem*, 2023, **15**, 1-10.
deN_2O	K/Co_3O_4	500 ppm N_2O in N_2, GHSV = 45000 h^{-1}	T_{100} ≈ 360 ºC	M.-J. Kim, S.-J. Lee, I.-S. Ryu, S.-H. Moon, M.-W. Jeon, C. H. Ko and S. G. Jeon, *Catal. Lett.*, 2017, **147**, 2886-2892.
deN_2O	Cs/Co_3O_4	1000 ppm N_2O, 3% O_2 balanced with N_2, total flow rate of 100 mL min^{-1}, GHSV = 30000 h^{-1}	More than 90% N_2O conversion at 300 ºC	F. Zhao, D. Wang, X. Li, Y. Yin, C. Wang, L. Qiu, J. Yu and H. Chang, *Ind. Eng. Chem. Res.*, 2022, **61**, 13854-13862.
deN_2O	$Gd_{0.06}Co$	2000 ppmv N_2O in Ar, total flow rate of 50 mL min^{-1}, GHSV = 20000 h^{-1}	T_{100} < 350 ºC	Y. Xiong, Y. Zhao, X. Qi, J. Qi, Y. Cui, H. Yu and Y. Cao, *Environ. Sci. Technol.*, 2021, **55**, 13335-13344.
deN_2O	Sm-Co_3O_4	1000 ppm N_2O in N_2, total flow rate of 100 mL min^{-1}, GHSV = 60000 h^{-1}	T_{90} ≈ 375 ºC	H. Liu, J. Chen, Y. Wang, S. Xiong, Z. Su, Y. Wang, W. Yang, X. Chu, W. Yang, Y. Peng, W. Si and J. Li, *Chem. Eng. J.*, 2021, **414**, 128643.
deN_2O	Alkaline-earth metal-modified $A_{0.5}Co_{2.5}O_4$	0.65% N_2O, 0.88% O_2 in N_2, total flow rate of 80 mL min^{-1}, GHSV = 55000 h^{-1}	T_{10} = 378 ºC, T_{90} = 533 ºC (Co_3O_4); T_{90} = 460 ºC (A = Ba);	J. Sun, L. Wang, L. Zhang, Y. Zhao, Y. Chi, H. Wang, C. Li, J. Liu and J. Liu, *ACS Appl. Energy Mater.*, 2021, **4**, 8496-8505.
deN_2O	$K_{0.01}Bi_{0.02}Co$	2000 ppm N_2O in Ar, GHSV = 20000 h^{-1}	55% N_2O conversion at 200 ºC	M. Tursun, B. Wang, Y. Jiang, H. Yu, X. Sun and X. Wang, *Chem. Res. Chinese U.*, 2016, **32**, 418-422.
deN_2O	SnO_2-Co_3O_4	1000 ppm N_2O balanced with Ar, GHSV = 10000 h^{-1}	T_{100} = 360 ºC	Y. Wang, X. Hu, K. Zheng, X. Wei and Y. Zhao, *Catal. Commun.*, 2018, **111**, 70-74.
deN_2O	NiO	2000 ppm N_2O balanced with He, total flow rate of 200 cm^3 min^{-1}, GHSV = 105000 h^{-1}	T_{50} = 392 ºC, T_{90} = 467 ºC	Z. Liu, Z. Zhou, F. He, B. Chen, Y. Zhao and Q. Xu, *Catal. Today*, 2017, **293-294**, 56-60.
deN_2O	NiO	500 ppm N_2O in He, total flow rate of 200 mL min^{-1}, W/F value of 0.15 g s cm^{-3}	T_{50} = 409 ºC, 70% N_2O conversion at 500 ºC	B. Abu-Zied, S. Bawaked, S. Kosa and W. Schwieger, *Catalysts*, 2016, **6**, 70.
deN_2O	Gd/NiO	500 ppm N_2O in He, total flow rate of 200 mL min^{-1}, W/F value of 0.15 g s cm^{-3}	T_{50} = 333 ºC, T_{100} = 500 ºC	Abu-Zied, S. Bawaked, S. Kosa and W. Schwieger, *Catalysts*, 2016, **6**, 70.
deN_2O	$Bi_{0.1}NiO_{1.15}$	200 ppm N_2O, 1% O_2 balanced with N_2, total flow rate of 3.1 L min^{-1}, GHSV = 45000 h^{-1}	T_{50} = 328 ºC, T_{90} = 385 ºC	M. X. Xu, H. X. Wang, H. D. Ouyang, L. Zhao and Q. Lu, *J. Hazard. Mater.*, 2021, **401**, 123334.
deN_2O	$Cd_{0.04}Ni$	1000 ppm N_2O, % O_2 balanced with N_2, GHSV= 30000 h^{-1}	T_{90} = 350 ºC	F. Zhao, C. Wang, D. Wang, Y. Yin, J. Yu, J. Han, J. Zeng and H. Chang, *Appl. Catal. A-Gen.*, 2023, **649**, 118946.
deN_2O	$Sm_{0.06}Ni$	2000 ppmv N_2O, 5 vol.% O_2, 100 ppmv NO, 5 vol.% H_2O balanced with Ar, total flow rate of 50 mL min^{-1}, GHSV = 20000 h^{-1}	T_{100} = 400 ºC (when only 5 vol.% H_2O); 76 % N_2O conversion at 400 ℃	J. Qi, X. Qi, Y. Pan, J. Cui, Y. Xiong, W. Shan and H. Yu, *Appl. Surf. Sci.*, 2023, **611**, 155657.
deN_2O	8% Ni/CeO_2-NR	2% N_2O in He, GHSV = 19 000 h^{-1}	T_{50} = 350 ºC	P. Zhao, F. Qin, Z. Huang, C. Sun, W.

				Shen and H. Xu, *Catal. Sci. Technol.*, 2018, **8**, 276-288.
deN_2O	NiO@CeO_2-HPOC	2% N_2O in He, GHSV = 19 000 h^{-1}	T_{90} = 400 ºC	P. Zhao, F. Qin, Z. Huang, C. Sun, W. Shen and H. Xu, *Chem. Eng. J.*, 2018, **349**, 72-81.
deN_2O	NiO@CeO_2-HPOC	2% N_2O, 2% O_2 in He, GHSV = 19 000 h^{-1}	T_{100} = 450 ºC	P. Zhao, F. Qin, Z. Huang, C. Sun, W. Shen and H. Xu, *Chem. Eng. J.*, 2018, **349**, 72-81.
deN_2O	NiO/CeO_2-C	2% N_2O in He, GHSV = 19 000 h^{-1}	T_{90} = 475 ºC	P. Zhao, F. Qin, Z. Huang, C. Sun, W. Shen and H. Xu, *Chem. Eng. J.*, 2018, **349**, 72-81.
deN_2O	NiO/CeO_2-C	2% N_2O, 2% O_2 in He, GHSV = 19 000 h^{-1}	T_{100} > 500 ºC	P. Zhao, F. Qin, Z. Huang, C. Sun, W. Shen and H. Xu, *Chem. Eng. J.*, 2018, **349**, 72-81.
deN_2O	Cu/Si-Al hollow sphere	0.5% N_2O in Ar, total flow rate of 50 mL min^{-1}	> 80% N_2O conversion at 400 ºC	T. Umegaki, M. Dobashi, T. Komuro and Y. Kojima, *New J. Chem.*, 2022, **46**, 11166-11173.
deN_2O	(10 wt.%) Fe/Al_2O_3	1000 ppm N_2O in He, total flow rate of 60 cm^{-3} min^{-1}	T_{100} ≈ 650 ºC	M. Haneda, M. Shinriki, Y. Nagao, Y. Kintaichi and H. Hamada, *Bull. Chem. Soc. Jpn.*, 2003, **76**, 2329-2333.
deN_2O	Mn_2O_3	P_{N2O} = 0.066 atm, total flow rate of 30 mL min^{-1}, GHSV = 2000 h^{-1}	r_{N2O} = 4.8 * 10^{-3} mol min^{-1} s^{-1} m^{-2} at 350 ºC	T. Yamashita and A. Vannice, *J. Catal.*, 1996, **161**, 254-252.
deN_2O	Co_3O_4/m-ZrO_2	1000 ppm N_2O in Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	Nearly 80% N_2O conversion at 400 ºC	X. Hu, Y. Wang, R. Wu, L. Zhao, X. Wei and Y. Zhao, *Appl. Surf. Sci.*, 2020, **514**, 145892.
deN_2O	Co_3O_4/m-ZrO_2	1000 ppm N_2O, 3% O_2 in Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	62% N_2O conversion at 400 ºC	X. Hu, Y. Wang, R. Wu, L. Zhao, X. Wei and Y. Zhao, *Appl. Surf. Sci.*, 2020, **514**, 145892.
deN_2O	Co_3O_4/m-ZrO_2	1000 ppm N_2O, 3.3% H_2O in Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	57% N_2O conversion at 400 ºC	X. Hu, Y. Wang, R. Wu, L. Zhao, X. Wei and Y. Zhao, *Appl. Surf. Sci.*, 2020, **514**, 145892.
deN_2O	Co_3O_4/m-ZrO_2	1000 ppm N_2O, 200 ppm NO in Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	69% N_2O conversion at 400 ºC	X. Hu, Y. Wang, R. Wu, L. Zhao, X. Wei and Y. Zhao, *Appl. Surf. Sci.*, 2020, **514**, 145892.
deN_2O	$Ba_{0.2}Ce_{0.5}Cu$	2000 ppmv N_2O in Ar, total flow rate of 50 mL min-1, GHSV = 20000 h^{-1}	T_{100} = 450 ºC	Y. Li, X. Wang and C. Shi, *J. Environ. Chem. Eng.*, 2023, **11**, 109970.
deN_2O	$Ba_{0.2}Ce_{0.5}Cu$	2000 ppmv N_2O, 1000 ppmv NO in Ar, total flow rate of 50 mL min-1, GHSV = 20000 h^{-1}	T_{90} = 450 ºC	Y. Li, X. Wang and C. Shi, *J. Environ. Chem. Eng.*, 2023, **11**, 109970.
deN_2O	Cu/$Ce_{0.5}Y_{0.5}$	450 ppm N_2O in N_2, total flow rate of 500 mL min^{-1}	T_{100} = 500 ºC	S. Choi, K. Bok Nam, H. Phil Ha and D. Wook Kwon, *J. Ind. Eng. Chem.*, 2023, **121**, 462-471.
deN_2O	ZrO_2-Y_2O_3	0.5 vol.% N_2O in He, total flow rate of	T_{100} ≈ 800 ºC	C.-M. Cho, N. Nunotani and N. Imanaka,

		660 mL min^{-1}, weight/gas flow rate (W/F) ratio of 0.2 g s mL^{-1}		*J. Asian Ceram. Soc.*, 2019, **7**, 518-523.
deN_2O	$CuO-Co_3O_4$	1000 ppm N_2O balanced with N_2, total flow rate of 100 mL min^{-1}, GHSV of 60 000 cm^3 g^{-1} h^{-1}	T_{100} = 375 °C	S. Xiong, J. Chen, N. Huang, S. Yang, Y. Peng and J. Li, *Environ. Sci. Technol.*, 2019, **53**, 10379-10386.
deN_2O	Y_2O_3-Co_3O_4	1000 ppm N_2O balanced with Ar, GHSV of 10000 h^{-1}	T_{100} = 360 °C	Y. Wang, K. Zheng, X. Hu, W. Zhou, X. Wei and Y. Zhao, *Mol. Catal.*, 2019, **470**, 104-111.
deN_2O	$(Yb_{1-x}Cox)_2O_{3-\delta}$	5000 ppm N_2O balanced with He, total flow rate of 60 mL min^{-1}, weight/gas flow rate (W/F) ratio of 0.2 g s mL^{-1}	T_{100} = 500 °C	C.-M. Cho, N. Nunotani and N. Imanaka, *Bull. Chem. Soc. Jpn.*, 2019, **92**, 1148-1153.
deN_2O	K/Y_2O_3-Co_3O_4	1000 ppm N_2O balanced with Ar, total flow rate of 150 mL min^{-1}, GHSV = 12700 cm^3 g^{-1} h^{-1}	T_{100} = 350 °C	T. Zhao, Y. Li, Q. Gao, Z. Liu and X. Xu, *Catal. Commun.*, 2020, **137**, 105948.
deN_2O	$PrBaCoO_3$	1% N_2O in He, total flow rate of 100 mL min^{-1}, GHSV = 38 000 h^{-1}	T_{50} = 410 °C	N. Richards, J. H. Carter, L. A. Parker, S. Pattisson, D. G. Hewes, D. J. Morgan, T. E. Davies, N. F. Dummer, S. Golunski and G. J. Hutchings, *ACS Catal.*, 2020, **10**, 5430-5442.
deN_2O	Co_3O_4/CeO_2	1000 ppm N_2O, total flow rate of 150 cm^{-3} min^{-1}, GHSV = 40000 h^{-1}	T_{100} = 500 °C	M. Lykaki, E. Papista, N. Kaklidis, S. Carabineiro and M. Konsolakis, *Catalysts*, 2019, **9**, 233.
deN_2O	$CoCe_{0.05}$	1000 ppm N_2O in Ar, flow rate of 150 cm^{-3} min^{-1}, space velocity of 0.2 g s cm^{-3}	T_{100} ≈ 275 °C	L. Xue, C. Zhang, H. He and Y. Teraoka, *Appl. Catal., B-Environ.*, 2007, **75**, 167-174.
deN_2O	Ce-Co-O	1000 ppm N_2O in He, total flow rate of 300 mL min^{-1}, GHSV = 80000 h^{-1}	T_{50} = 304 °C, T_{90} = 359 °C	Y. You, H. Chang, L. Ma, L. Guo, X. Qin, J. Li and J. Li, *Chem. Eng. J.*, 2018, **347**, 184-192.
deN_2O	K/Co-CeO_2	500 ppm N_2O in N_2, GHSV of 45000 h^{-1}	T_{100} = 375 °C	M.-J. Kim, S.-J. Lee, I.-S. Ryu, M.-W. Jeon, S.-H. Moon, H.-S. Roh and S. G. Jeon, *Mol. Catal.*, 2017, **442**, 202-207.
deN_2O	K/Co_3O_4–CeO_2	1000 ppm N_2O in Ar, flow rate of 150 cm^{-3} min^{-1}, space velocity of 0.2 g s cm^{-3}	T_{100} ≈ 280 °C	L. Xue, C. Zhang, H. He and Y. Teraoka, *Catal. Today*, 2007, **126**, 449-455.
deN_2O	Cs/Co_3O_4–CeO_2	1000 ppm N_2O in Ar, flow rate of 150 cm^{-3} min^{-1}, space velocity of 0.2 g s cm^{-3}	T_{100} ≈ 300 °C	L. Xue, H. He, C. Liu, C. Zhang and B. Zhang, *Environ. Sci. Technol.*, 2009, **43**, 890-895.
deN_2O	NiO-CeO_2	2000 ppm N_2O balanced with He, total flow rate of 200 cm^3 min^{-1}, GHSV of 105000 h^{-1}	T_{50} = 367 °C, T_{90} = 424 °C	Z. Liu, Z. Zhou, F. He, B. Chen, Y. Zhao and Q. Xu, *Catal. Today*, 2017, **293-294**, 56-60.
deN_2O	CuO/CeO_2	2500 ppm N_2O in Ar, total flow rate of 100 mL min^{-1}, WHSV of 120 L g_{cat}^{-1} h^{-1}	T_{50} ≈ 420 °C	M. Zabilskiy, I. Arčon, P. Djinović, E. Tchernychova and A. Pintar,

				ChemCatChem, 2021, **13**, 1814-1823.
deN_2O	Co_3O_4/70Mg30Al	1000 ppm N_2O in N_2, GHSV = 10 L h^{-1} g^{-1}	T_{100} =425 °C	A. Klegová, K. Pacultová, D. Fridrichová, A. Volodarskaja, F. Kovanda and K. Jirátová, *Chem. Eng. Technol.*, 2017, **40**, 981-990.
deN_2O	K or Cs doped $Zn_{0.4}Co_{2.6}O_4$|Al_2O_3	5% N_2O in He, total flow rate of 30 mL min^{-1}, GHSV = 7000 h^{-1}	T_{50} ≈ 350 °C	K. Ciura, G. Grzybek, S. Wójcik, P. Indyka, A. Kotarba and Z. Sojka, *React. Kinet. Cat.*, 2017, **121**, 645-655.
deN_2O	K-$Co_{2.6}Zn_{0.4}O_4$|α-Al_2O_3	5% N_2O in He, GHSV of 7000 h^{-1}	T_{100} ≈ 500 °C	G. Grzybek, S. Wójcik, P. Legutko, J. Gryboś, P. Indyka, B. Leszczyński, A. Kotarba and Z. Sojka, *Appl. Catal., B-Environ.*, 2017, **205**, 597-604.
deN_2O	Cu–Zn/γ–Al_2O_3	12 vol.% N_2O, 16.8 vol.% O_2 in N_2, total flow rate of 120 mL min^{-1}, GHSV of 7200 h^{-1}	T_{100} = 601 °C	R. Zhang, C. Hua, B. Wang and Y. Jiang, *Catalysts*, 2016, **6**, 200.
deN_2O	Cu–Zn/$ZnAl_2O_4$	8.1 vol.% N_2O, 10.2 vol.% O_2 in N_2, total flow rate of 1200 mL min^{-1}, GHSV = 1200 h^{-1}	T_{100} = 650 °C	X. Zheng, R. Zhang, F. Bai and C. Hua, *Catalysts*, 2017, **7**, 166.
deN_2O	$MgCo_2O_4$	500 ppm N_2O, total flow rate of 200 cm^{-3} min^{-1}	T_{50} = 467 °C; 67% N_2O conversion at 500 °C	B. M. Abu-Zied, Chinese *J. Catal.*, 2011, **32**, 264-272.
deN_2O	Alkali promoted $MgCo_2O_4$	500 ppm N_2O, total flow rate of 200 cm^{-3} min^{-1}	T_{50} = 405 °C (Li-); T_{50} = 374 °C (Na-); T_{50} = 308 °C (K-); T_{50} = 332 °C (Cs-)	B. M. Abu-Zied, Chinese *J. Catal.*, 2011, **32**, 264-272.
deN_2O	Co_3O_4/MgO–Al_2O_3	2000 ppmv N_2O in Ar, total flow rate of 50 mL min^{-1}	T_{100} ≈ 600 °C	Y. Li and X. Wang, *Catal. Lett.*, 2019, **149**, 1856-1863.
deN_2O	$Mg_{0.9}Co_{0.1}Co_2O_4$	10 mol% N_2O in He, total flow rate of 35 mL min^{-1}, GHSV of 21200 h^{-1}	r_{N2O} = 30.6-38.9 mmol g^{-1} h^{-1} at 380 – 400 °C	U. Chellam, Z. P. Xu and H. C. Zeng, *Chem. Mater*, 2000, **12**, 650-658.
deN_2O	$Mn_{0.1725}Co_3AlO_x$	0.1% N_2O in N_2, total flow rate of 100 cm^{-3} min^{-1}, WHSV of 17 L h^{-1} g^{-1}	T_{50} = 305 °C T_{100} = 400 °C	M. Jabłońska, M. A. Arán, A. M. Beale, G. Delahay, C. Petitto, M. Nocuń and R. Palkovits, *Appl. Catal., B-Environ.*, 2019, **243**, 66-75.
deN_2O	$CoFe_2O_4$	1% N_2O in N_2, GHSV of 20000 h^{-1}	98.1% N_2O conversion at 475 °C	K. Denisova, A. A. Ilyin, R. Rumyantsev, J. Sakharova, A. P. Ilyin and N. Gordina, *Catalysts*, 2021, 11, 889.
deN_2O	$LaFeO_3$	100% N_2O, GHSV of 10 000 h^{-1}	T_{100} = 700 °C	E. M. Kostyukhin, A. L. Kustov, N. V. Evdokimenko, A. I. Bazlov and L. M. Kustov, *J. Am. Ceram. Soc.*, 2020, **104**, 492-503.
deN_2O	$La_{0.75}Sr_{0.25}FeO_3$	60.0 cm^3 min^{-1} with ratio N_2O:He =10:90	T_{100} = 575 °C	A. G. Margellou, T. C. Vaimakis, P. J. Pomonis and D. E. Petrakis, *React. Kinet. Cat.*, 2019, **127**, 825-838.
deN_2O	$LaCo_{0.8}Fe_{0.2}O_3$	0.1 vol.% N_2O, 5 vol.% NO, 6 vol.% O_2,	T_{50} = 563 °C	Y. Wu, X. Ni, A. Beaurain, C. Dujardin and

		15 vol.% H_2O in He, total flow rate of 15 L h^{-1}, GHSV of 30000 h^{-1}		P. Granger, *Appl. Catal., B-Environ.*, 2012, **125**, 149-157.
deN_2O	10 wt.% Fe_2O_3-ZrO_2	1000 ppm N_2O in He, total flow rate of 150 cm^{-3} min^{-1}, weight/gas flow rate (W/F) ratio of 0.2 g s mL^{-1}	Nearly 95% N_2O conversion at 550 °C	S. N. Basahel, M. Mokhtar, T. T. Ali and K. Narasimharao, *Catal. Today*, 2020, **348**, 166-176.
deN_2O	K doped Co–Mn–Al mixed oxide	0.1% N_2O in He, GHSV of 40380 h^{-1}	T_{100} = 420 °C	L. Obalová, K. Karásková, K. Jirátová and F. Kovanda, *Appl. Catal., B-Environ.*, 2009, **90**, 132-140.
deN_2O	Co–Mn–Al mixed oxide	1000 ppm N_2O in He, total flow rate of 100 mL min^{-1}	More than 80% N_2O conversion at 420 °C	L. Obalová, K. Pacultová, J. Balabánová, K. Jirátová, Z. Bastl, M. Valášková, Z. Lacný and F. Kovanda, *Catal. Today*, 2007, **119**, 233-238.
deN_2O	Co_3O_4 on open-cell metallic foam	1000 ppm N_2O in N_2, total flow rate of 80 mL min^{-1}, GHSV of 6800 h^{-1}	T_{50} = 460 °C	P. H. Ho, K. Ś. Da Costa, G. S. de Luna, M. Jabłońska, F. Ospitali, F. Di Renzo, G. Delahay, G. Fornasari, A. Vaccari, R. Palkovits and P. Benito, *Chem. Eng. Res. Des.*, 2022, **188**, 166-178.
deN_2O	$Co_4MnAlOx$/SiC-s.m	0.1 mol % N_2O in N_2, total flow rate of 700 mL min^{-1}, GHSV of 3000 m^3 m_{bed}^{-3} h^{-1}	40% N_2O conversion at 450 °C	A. Klegova, A. Inayat, P. Indyka, J. Gryboś, Z. Sojka, K. Pacultová, W. Schwieger, A. Volodarskaja, P. Kuśtrowski, A. Rokicińska, D. Fridrichová and L. Obalová, *Appl. Catal., B-Environ.*, 2019, **255**, 117745.
deN_2O	Co_3O_4-Cs on an open-cell foam	1000 ppm N_2O in N_2 and VHSV = 1500 m^3 m_{bed}^{-3} h^{-1}; or 1000 ppm N_2O, 2 mol % H_2O, 5 mol % O_2, 200 ppm NO in N_2 and VHSV = 510 m^3 m_{bed}^{-3} h^{-1}	＞87% N_2O conversion at 450 °C	A. Klegova, K. Pacultová, T. Kiška and L. Obalová, *Ind. Eng. Chem. Res.*, 2023, **62**, 1301-1309.
deN_2O	Co_3O_4-Cs (1 wt.%) on ceramic open-cell foams	1000 ppm N_2O in N_2 and GHSV = 1500011_{bed}^{-3} h^{-1}	＞90% N_2O conversion at 450 °C	K. Pacultová, A. Klegova, T. Kiška, D. Fridrichová, A. Martaus, A. Rokicińska, P. Kuśtrowski and L. Obalová, *Mater. Res. Bull.*, 2020, **129**, 110892.
deN_2O	Co-Cs/MgOc/Al_2O_3	0.1 mol.% N_2O in N_2, GHSV = 1500 m^3 $m^3_{bed}{}^{-1}$ h^{-1}	More than 90% N_2O conversion at 450 °C	A. Klegova, K. Pacultová, T. Kiška, P. Peikertová, A. Rokicińska, P. Kuśtrowski and L. Obalová, *Mol. Catal.*, 2022, **533**, 112754.
deN_2O	Co_3O_4|α-Al_2O_3|cordierite	5% N_2O in He, total flow rate of 30 mL min^{-1}, GHSV = 1600 h^{-1}	More than 80% N_2O conversion at 500 °C	S. Wójcik, G. Ercolino, M. Gajewska, C. W. M. Quintero, S. Specchia and A. Kotarba, *Chem. Eng. J.*, 2019, **377**, 120088.
deN_2O	K-Pb-Co_3O_4|α-Al_2O_3|cordierite	5% N_2O in He, total flow rate of 30 mL min^{-1}, GHSV = 7000 h^{-1}	More than 80% N_2O conversion at 400 °C	S. Wójcik, P. Indyka, Z. Sojka and A. Kotarba, *Catal. Today*, 2020, **348**, 111-117.
deN_2O	K-$Zn_{0.4}Co_{2.6}O_4$|α-	1.5% N_2O, 1% NOx, 1% H_2O, 2.0% O_2	More than 90% N_2O	S. Wójcik, G. Grzybek, J. Gryboś, A.

	Al_2O_3|cordierite	in He, total flow rate of 90 mL min^{-1}	conversion at T < 400 °C	Kotarba and Z. Sojka, *Catal. Commun.*, 2018, **110**, 64-67.
deN_2O	NiCoAl/SiC	20 vol.% N_2O in Ar, WHSV = 5 h^{-1} or 20 h^{-1}	T_{100} = 420 °C (20 h^{-1}); T_{100} = 340 °C (5 h^{-1})	O. Muccioli, E. Meloni, S. Renda, M. Martino, F. Brandani, P. Pullumbi and V. Palma, *Processes*, 2023, **11**, 1511.
deN_2O	Fe-BEA monolith catalysts	N_2O: He: O_2 = 35: 60: 5, GHSV = 4000 h^{-1}	T_{100} ≈ 500 °C	R. Zhang, K. Hedjazi, B. Chen, Y. Li, Z. Lei and N. Liu, *Catal. Today*, 2016, **273**, 273-285.
deN_2O	Fe/ZSM-5	0.3 mbar N_2O, 60 mbar O_2, 0.1 mbar NO, 0.14 mbar CO, 0.1 mbar SO_2, and 100 mbar H_2O in He, W/F°(N_2O) of 1245 g h mol^{-1}	T_{100} ≈ 650 °C	M. Santiago, M. A. G. Hevia and J. Pérez-Ramírez, *Appl. Catal., B-Environ.*, 2009, **90**, 83-88.
deN_2O	Fe-ZSM-5	1.2 vol.% N_2O in He, total flow rate of 20 mL min^{-1}	T_{100} = 525 °C	X. Liang, H. Tang, F. Yang, G. Tu, F. Zhang, Q. Xiao, Y. Zhong and W. Zhu, *Micropor. Mesopor. Mat.*, 2019, **290**, 109655.
deN_2O	Fe-ZSM-5	1500 ppm N_2O in Ar, GHSV = 35000 h^{-1}	T_{90} = 620 °C	G. He, B. Zhang, H. He, X. Chen and Y. Shan, *Sci Total Environ*, 2019, **673**, 266-271.
deN_2O	Fe/ZSM-5	0.15 vol.%N_2O in He, GHSV = 35000 h^{-1}	more than 90% N_2O conversion at 525 °C	B. Zhang, F. Liu, H. He and L. Xue, *Chinese J. Catal.*, 2014, **35**, 1972-1981.
deN_2O	Fe-ZSM-5	5% O_2, 5000 ppm N_2O in Ar, total flow rate of 200 mL min^{-1}, GHSV = 30000 h^{-1}	75% of conversion at 500 °C	M. Wu, H. Wang, L. Zhong, X. Zhang, Z. Hao, Q. Shen, W. Wei, G. Qian and Y. Sun, *Chinese J. Catal.*, 2016, **37**, 898-907.
deN_2O	Fe-ZSM-5	500 ppm N_2O in He; total flow rate of 125 cm^3 min^{-1}	T_{100} ≈ 450 °C	B. M. Abu-Zied, W. Schwieger and A. Unger, *Appl. Catal., B-Environ.*, 2008, **84**, 277-288.
deN_2O	Co/Beta	30 vol % N_2O, GHSV = 30 000 h^{-1}	About 99.6% of conversion at 450 °C	B. Kang, R. Zhang, M. Guo, X. Guo, Z. Di, Y. Wei and J. Jia, *Energy Fuels*, 2023, **37**, 18019-18029.
deN_2O	Fe-beta	5% O_2, 5000 ppm N_2O in Ar, total flow rate of 200 mL min^{-1}, GHSV = 30000 h^{-1}	T_{90} = 425 °C	M. Wu, H. Wang, L. Zhong, X. Zhang, Z. Hao, Q. Shen, W. Wei, G. Qian and Y. Sun, *Chinese J. Catal.*, 2016, **37**, 898-907.
deN_2O	Co-ZSM-5	30% N_2O in He, total flow rate of 80 mL min^{-1}, GHSV = 30000 h^{-1}	More than 90% of conversion at 500 °C	B. Kang, M. Li, Z. Di, X. Guo, Y. Wei, J. Jia and R. Zhang, *Catal. Today*, 2022, **402**, 17-26.
deN_2O	Cu/ZSM-5	1 vol.% N_2O in He, GHSV = 12000 h^{-1}	T_{50} = 368 °C	G. A. Zenkovets, R. A. Shutilov, V. I. Sobolev and V. Y. Gavrilov, *Catal. Commun.*, 2020, **144**, 106072.
deN_2O	CuZSM-5	1 vol.% N_2O in He, GHSV = 6000 h^{-1}	T_{50} = 520 °C T_{100} = 580 °C	S. A. Yashnik, A. V. Salnikov, N. T. Vasenin, V. F. Anufrienko and Z. R.

				Ismagilov, *Catal. Today*, 2012, **197**, 214-227.
deN_2O	Fe-FER	1000 ppm N_2O, 0.5% NO, 2% O_2, 10% H_2O and He, GHSV = 3.5 × 10^5 h^{-1}	T_{100} = 600 °C	G. Sádovská, E. Tabor, P. Sazama, M. Lhotka, M. Bernauer and Z. Sobalík, *Catal. Commun.*, 2017, **89**, 133-137.
deN_2O	Fe-FER	1000 ppm N_2O, 0.5% NO, 2% O_2 and 10% H_2O in He, GHSV = 3.5 × 10^5 h^{-1}	T_{50} = 435 °C	G. Sádovská, M. Bernauer, B. Bernauer, E. Tabor, A. Vondrová and Z. Sobalík, *Catal. Commun.*, 2018, **112**, 58-62.
deN_2O	Fe/CHA	500 ppm N_2O, 5% H_2O and Ar, total flow rate of 200 mL min^{-1}, GHSV ≈ 400000 h^{-1}	More than 80% of conversion at 600 °C	T. Zhang, Y. Qiu, G. Liu, J. Chen, Y. Peng, B. Liu and J. Li, *J. Catal.*, 2020, **392**, 322-335.
deN_2O	Fe-FAU	1500 ppm N_2O in He, total flow rate of 60 mL min^{-1}, GHSV = 30000 h^{-1}	T_{50} = 397 °C T_{100} = 477 °C	L. Li, Q. Shen, J. Li, Z. Hao, Z. P. Xu and G. Q. M. Lu, *Appl. Catal. A-Gen.*, 2008, **344**, 131-141.
deN_2O	Fe-PST-7(HS)	1000 ppm N_2O, 4% O_2 in He, GHSV = 42000 h^{-1}	T_{50} = 710 K	J. B. Lim, S. H. Cha and S. B. Hong, *Appl. Catal., B-Environ.*, 2019, **243**, 750-759.
deN_2O	Ru + Co/US-Y	5000 ppm N_2O in He, total flow rate of 60 mL min^{-1}, GHSV = 36000 h^{-1}	T_{90} = 310 °C	N. Labhsetwar, M. Dhakad, R. Biniwale, T. Mitsuhashi, H. Haneda, P. S. S. Reddy, S. Bakardjieva, J. Subrt, S. Kumar, V. Kumar, P. Saiprasad and S. Rayalu, *Catal. Today*, 2009, **141**, 205-210.
deN_2O	Mg–Al–Fe–LDHs	1000 ppm N_2O, GHSV = 2:17 cm^3_{NTP} g_{cat}^{-1} s^{-1}	More than 80% N_2O conversion at 500 °C	T. J. Vulic, A. F. K. Reitzmann and K. Lázár, *Chem. Eng. J.*, 2012, **207-208**, 913-922.
deN_2O	Co/CoO_x@Carbon	200 ppm N_2O in N_2, total flow rate of 300 mL min^{-1}, GHSV = 30000 h^{-1}	T_{50} = 305 °C T_{100} ≈ 400 °C	H. Tang, Y. He, P. Liu, J. Shao, F. Lin and Z. Wang, *Energy Fuels*, 2021, **35**, 18664-18679.
deN_2O	Co/nHAP	1000 ppm N_2O in Ar, total flow rate of 75 mL min^{-1}, GHSV = 15000 h^{-1}	T_{100} = 460 °C	X. Wei, Y. Wang, X. Li, R. Wu and Y. Zhao, *Mol. Catal.*, 2020, **49**1, 111005.
deN_2O	Co_3O_4/$BaCO_3$	2000 ppmv N_2O in Ar, GHSV = 20000 h^{-1}	T_{100} = 400 °C	H. Yu, X. Wang and X. Wu, *Mol. Catal.*, 2018, **460**, 69-73.
deN_2O	Co_3O_4/$CaCO_3$	2000 ppmv N_2O in Ar, GHSV = 20 000 h^{-1}	T_{100} = 300 °C	H. Yu, X. Wang and Y. Li, *Catal. Today*, 2020, **339**, 274-280.
deN_2O	Co_3O_4/g-CN	1000 ppm N_2O in Ar, total flow rate of 50 mL min^{-1}, GHSV = 10000 h^{-1}	T_{100} = 400 °C	X. Hu, Y. Wang, R. Wu and Y. Zhao, *Appl. Surf. Sci.*, 2021, **538**, 148157.
deN_2O	RuOx/HAP	0.5 vol.% N_2O in He, total flow rate of 60 mL min^{-1}	T_{100} = 400 °C	Y. Cui, H. Liu, Y. Lin and Z. Ma, *J. Taiwan Inst. Chem. E.*, 2016, **67**, 254-262.
H_2-SCR	Ni-Pt/SiO_2	2500 ppm N_2O, 2500 ppm H_2, balanced by He, GHSV = 25000 h^{-1}	More than 80% N_2O conversion at 350 K	J. Arenas-Alatorre, A. Gómez-Cortés, M. Avalos-Borja and G. Díaz, *J. Phys. Chem. B*, 2005, **109**, 2371-2376.
H_2-SCR	RuO_2	N_2O (1.5 mbar), H_2 (1.5 mbar), balanced by He, other conditions: W/F (N_2O) = 498 g h mol^{-1}	100% N_2O conversion at 625 K	M. Santiago, V. A. Kondratenko, E. V. Kondratenko, N. López and J. Pérez-Ramírez, *Appl. Catal., B-Environ.*, 2011,

				110, 33-39.
CO-SCR	Fe(97)-BEA	0.2% N_2O, 0.2% CO, 3% O_2, ramp = 10 K/min^{-1}, GHSV = 35000 h^{-1}	More than 95% N_2O conversion at 480 °C	G. Delahay, M. Mauvezin, A. Guzman-Vargas and B. J. C. C. Coq, *Catal. Commun.*, 2002, **3**, 385-389.
CO-SCR	0.2 wt% Rh/Al_2O_3	CO and $N_2O$of 5×10^{-3} atm and a space velocity of 25,000 h^{-1}	T_{50} = 295 °C	P. Granger, *J. Catal.*, 2004, **223**, 142-151.
CO-SCR	Co–Pd–Al (1/0.1/1) htlc	12,500 ppm N_2O, 17,500 ppm CO, GHSV = 30000 h^{-1}	More than 95% N_2O conversion at 200 °C	K. S. Chang, H.-J. Lee, Y.-S. Park and J.-W. Woo, *Appl. Catal. A-Gen.*, 2006, **309**, 129-138.
CO-SCR	Fe-ZSM-5	1.5 mbar of N_2O and 1.5 mbar of CO with He as balance, GHSV = 90000 h^{-1}	More than 90% N_2O conversion at 427 °C	M. N. Debbagh, C. S. M. d. Lecea and J. Pérez-Ramírez, *Appl. Catal., B-Environ.*, 2007, **70**, 335-341.
CO-SCR	Co–Mn–Al spinel	0.1 mol% N_2O, 0.15 mol% CO, balanced by He, 330 mL/min, .0.33 g of catalyst	More than 95% N_2O conversion at 350 °C	K. Pacultová, L. Obalová, F. Kovanda and K. Jirátová, *Catal. Today*, 2008, **137**, 385-389.
CO-SCR	0.5 wt% Rh/SiO_2	1927 ppm N_2O, 1980 ppm CO over 75 mg of 0.5 wt% Rh/SiO_2, balance He with total flow rate of 100 cm^3 (STP)/min	More than 95% N_2O conversion at 350 °C	N. W. Cant, C. C. Dean, and O. L. Irene, *J. Catal.* **2011***, 278,* 162-166.
CO-SCR	Synthetic coal char M6	420 μL L^{-1} of N_2O and CO of 0.45 vol.%, 0.1 g synthetic coal char M6	More than 80% N_2O conversion at 600 °C	C.A. Wang, Y. Du, and D. Che, *P. Combust. Inst.* **2015***, 35*, 2323-2330.
CO-SCR	$Pt-Co_3O_4/CeO_2$ (10:10%)	Mixture of CO and N_2O in 1:1 vol.%, 35 cm^3 min^{-1} of flow velocity, about 150 mg of catalyst	T_{90} = 210 °C	Z. Z. Khan, I. A. Khan, I. Khan, M. H. Sarwar Wattoo and A. Badshah, *Solid State Sci.*, 2019, **98**, 106035.
CO-SCR	Fe-Z-pH2 (Fe-ZSM-5 ion-exchanged under pH of 2)	1000 ppm N_2O, 1000 ppm CO, the total gas flow of 100 ml/min, 0.3 g catalysts	T_{90} = 300 °C	Y. You, S. Chen, J. Li, J. Zeng, H. Chang, L. Ma and J. Li, *J. Hazard. Mater.*, 2020, **383**, 121117.
NH_3-SCR	RuO_2	1.5 mbar N_2O, 1.5 mbar NH_3, 1.5 mbar H_2, balanced with He,	T_{100} ≈ 623 K	M. Santiago, V. A. Kondratenko, E. V. Kondratenko, N. López and J. Pérez-Ramírez, *Appl. Catal., B-Environ.*, 2011, **110**, 33-39.
NH_3-SCR	Cu/SSM	0.5% N_2O, 5% NH_3 in Ar, total flow rate of 50 mL min^{-1}	T_{100} = 400 °C	T. Umegaki, D. Noguchi and T. Fukumoto, *ChemistrySelect*, 2022, **7**, 1-6.
NH_3-SCR	Rh–FAU	0.2 vol% N_2O, 0.2% NH_3, balance with He; total flow rate = 90 cm^3 min^{-1} (space velocity: 30,000 h^{-1})	100% N_2O conversion at 300 °C	M. Mauvezin, G. Delahay, B. Coq, and S. Kieger,*Appl. Catal., B-Environ.* **1999***, 23*, L79-L82.
NH_3-SCR	Fe(49)-BEA	$N_2O/O_2/NH_3/He$ 3% O_2 (0.2/3.0/0.2/96.6), GHSV = 35000 h^{-1}	T_{50} = 392 °C	M. Mauvezin, G. Delahay, F. Kisslich, B. Coq, and S. Kieger, *Catal. Lett.* **1999***, 62*, 41-44.
NH_3-SCR	Fe-MOR	5000 ppm N_2O, 4000 ppm NH_3, 5% O_2, balanced with He. GHSV = 30 000 h^{-1}.	T_{100} = 700 K	X. Zhang, Q. Shen, C. He, C. Ma, J. Cheng, L. Li and Z. Hao, *ACS Catal.*, 2012, **2**, 512-520.
NH_3-SCR	Fe-MOR	5000 ppm N_2O, 4000 ppm NH_3, 5% O_2, balanced with He. GHSV = 30000 h^{-1}.	T_{90} = 685 K	X. Zhang, Q. Shen, C. He, C. Ma, J. Cheng and Z. Hao, *Catal. Commun.*,

				2012, **18**, 151-155.
NH_3-SCR	Fe-BEA	$N_2O/NH_3/O_2/He$ = 0.2/0.2/3/99.6, space velocity = 35000 h^{-1}	More than 80% N_2O conversion at 427 °C	B. Coq, M. Mauvezin, G. Delahay and S. Kieger, *J. Catal.*, 2000, **195**, 298-303.
NH_3-SCR	Fe(97)BEAe	$N_2O/O_2/NH_3/He$ (0.2/3.0/0.2/96.6), VVH=35,000 h^{-1}	T_{50} = 380 °C	G. Delahay, M. Mauvezin, B. Coq and S. J. J. o. C. Kieger, *J. Catal.*, 2001, **202**, 156-162.
NH_3-SCR	Fe(100)-FER	$N_2O/O_2/NH_3/He$ (0.2/3.0/0.2/96.6), GHSV: 35000 h^{-1}	More than 90% N_2O conversion at 457 °C	A. Guzmanvargas, *Appl. Catal., B-Environ.*, 2003, **42**, 369-379.
NH_3-SCR	Fe(0.24)-MFI	N_2O (1000 ppm), NH_3 (670 ppm), balanced with He, 100 mg catalyst, total flow rate: 0.41 g h/mol	T_{100} = 400 °C	K. Sugawara, T. Nobukawa, M. Yoshida, Y. Sato, K. Okumura, K. Tomishige, and K. Kunimori, *Appl. Catal., B-Environ.* **2007***, 69*, 154-163.
NH_3-SCR	Fe/Beta (0.63 wt%)	540 ppm of N_2O, 360 ppm NH_3 and 2.5% H_2O balanced with N_2, GHSV = 200,000 h^{-1}	More than 70% N_2O conversion at 400 °C	A. Wang, Y. Wang, E. D. Walter, R. K. Kukkadapu, Y. Guo, G. Lu, R. S. Weber, Y. Wang, C. H. F. Peden and F. Gao, *J. Catal.*, 2018, **358**, 199-210.
NH_3-SCR	Fe-beta catalyst	1670 ppm of NH_3, 1000 ppm of N_2O, 3% O_2, balanced with N_2, 0.15 g of catalysts, and a total flow rate of 100 mL min^{-1}	T_{90} = 400 °C	J. Zeng, S. Chen, Z. Fan, C. Wang, H. Chang and J. Li, *Ind. Eng. Chem. Res.*, 2020, **59**, 19500-19509.
NH_3-SCR	1% Fe-SSZ-13	500 ppm NH_3, 1000 ppm N_2O, 5% H_2O, balanced with N_2 at a GHSV of 20,000 h^{-1}	T_{90} = 400 °C	J. Cheng, D. Zheng, G. Yu, R. Xu, C. Dai, N. Liu, N. Wang and B. Chen, *ACS Catal.*, 2022, **13**, 934-947.
HCs-SCR	(10 wt.%) Fe/Al_2O_3	1000 ppm N_2O, 1000 ppm CH_4 in He, total flow rate of 60 cm^{-3} min^{-1}	T_{100} ≈ 500 °C	M. Haneda, M. Shinriki, Y. Nagao, Y. Kintaichi and H. Hamada, *Bull. Chem. Soc. Jpn.*, 2003, **76**, 2329-2333.
HCs-SCR	Fe-ZSM-5 supported on ceramic monoliths	500 ppmv N_2O, 500 ppmv hydrocarbon, N_2 balance, GHSV = 12000 h^{-1}	T_{90} = 382 °C (methane), T_{90} = 400 °C (propane), T_{90} = 478 °C (propene)	E. Ruiz-Martínez, J. M. Sánchez-Hervás and J. Otero-Ruiz, *Appl. Catal., B-Environ.*, 2004, **50**, 195-206.
HCs-SCR	The hydrotalcite-derived Mg–Cr–Fe–O catalysts	0.8 vol% N_2O and the N_2O/EB molar ratio of 1:1), GHSV = 22000 h^{-1}	T_{50} = 450 °C, T_{90} = 500 °C	P. Kuśtrowski, L. Chmielarz, A. Rafalska-Łasocha, B. Dudek, A. Pattek-Janczyk and R. Dziembaj, *Catal. Commun.*, 2006, **7**, 1047-1052.
HCs-SCR	Fe-silicalite	Mixtures of N_2O: Xe = 1:1 (pump) and CH_4:Ne = 1:1 (probe)	More than 60% N_2O conversion at 450 °C	E. V. Kondratenko and J. Pérez-Ramírez, *Catal. Today*, 2007, **119**, 243-246.
HCs-SCR	FeZSM-5 (Si/Al = 31.3 and 0.67 wt% Fe)	Conditions: the mixtures contain 1.5 mbar of N_2O, 0.93 mbar of CH_4, or 0.44 - 0.57 mbar of one of the other hydrocarbons, and 20 mbar of O_2, the balance is He, P = 1 bar and GHSV = 60 000 h^{-1}	T_{50} = 340 °C (CH_4), T_{50} = 332 °C (C_2H_6), T_{50} = 337 °C (C_3H_8), T_{50} = 342 °C (C_2H_4), T_{50} = 352 °C (C_2H_2), T_{50} = 362 °C (C_3H_4)	M. A. Hevia, and J. Perez-Ramirez, *Environ. Sci. Technol.* **2008***, 42*, 8896-8900.
HCs-SCR	Co-MOR-104	$N_2O:CH_4:O_2$ (4000:4000:20000 ppm), GHSV = 15000 h^{-1}, He as balance	More than 80% N_2O conversion at 500 °C	M. C. Campa, D. Pietrogiacomi and M. Occhiuzzi, *Appl. Catal., B-Environ.*, 2015,

				168-169, 293-302.
HCs-SCR	CoO_x supported on ZrO_2	N_2O:C_3H_6:O_2 = 4000:2000:20000 ppm (v/v), GHSV = 24000, He as balance	More than 80% N_2O conversion at 500 °C	M. C. Campa, D. Pietrogiacomi, C. Scarfiello, L. R. Carbone and M. Occhiuzzi, *Appl. Catal., B-Environ.*, 2019, **240**, 367-372.
HCs-SCR	CoO_x/ZrO_2	4000 ppm N_2O, 2000 ppm C_3H_6, 2000 ppm O_2, total flow rate of 50 cm^3_{STP}/min^{-1}, GHSV = 24000 h^{-1}	About 80% N_2O conversion at 750 K	D. Pietrogiacomi, M. C. Campa, L. R. M. C. Campa, D. Pietrogiacomi, C. Scarfiello, L. R. Carbone and M. Occhiuzzi, *Appl. Catal., B-Environ.*, 2019, **240**, 367-372.
HCs-SCR	Fe-MOR-64	4000 ppm for N_2O and CH_4 and 20000 ppm for O_2, GHSV = 15000 h^{-1}, He as balance	More than 95% N_2O conversion at 377 °C	D. Pietrogiacomi, M. C. Campa, L. Ardemani, and M. Occhiuzzi, *Catal. Today* **2019***, 336*, 131-138.
HCs-SCR	Pt,Pd,Rh/Al_2O_3-ZrO_2	[N_2O] = [CH_4] = 4000 ppm, [O_2] = 20000 ppm, GHSV = 12000 NL kg h^{-1}, He as balance	More than 90% N_2O conversion at 500 °C	M. C. Campa, A. M. Doyle, G. Fierro and D. Pietrogiacomi, *Catal. Today*, 2022, **384-386**, 76-87.
HCs-SCR	CuFeOx thin-film catalysts	1% N_2O, 1% CH_4 in Ar as the balanced gas, GHSV = 185000 mL/(g h)	80% N_2O conversion at 490 °C	W. Muhammad, L. Wu, A. El Kasmi, A. Muhammad, and Z. Tian, *J. Therm. Sci.* **2023***, 32*, 531-541.
Photocatalytic decomposition	g-C_3N_4	Reactor filled with the N_2O/He mixture (1020 ppm) and illuminated by an 8 W Hg lamp with a maximum light intensity at 254 nm	About 43 % N_2O conversion after 14 h	P. Praus, L. Svoboda, M. Ritz, I. Troppová, M. Šihor and K. Kočí, *Mater. Chem. Phys.*, 2017, **193**, 438-446.
Photocatalytic decomposition	$BiVO_4$	3 vol.% O_2, 0.68 vol.% N_2O and balance Ar, and the catalyst used is 0.20 g; under UVA (λ = 365 nm) irradiation with Xenon lamp at ambient temperature	26.7% N_2O conversion after 12 h	L. Wang, J. Liu, W. Song, H. Wang, Y. Li, J. Liu, Z. Zhao, J. Tan, Z. Duan and J. Deng, *Chem. Eng. J.*, 2019, **366**, 504-513.
Photocatalytic decomposition	$BiVO_4$	680 ppm of N_2O, 3 vol % O_2, and balance Ar, under the visible light irradiation (λ > 420 nm)	27.1% N_2O conversion after 12 h	J. Liu, L. Wang, W. Song, M. Zhao, J. Liu, H. Wang, Z. Zhao, C. Xu and Z. Duan, *ACS Sustainable Chem. Eng.*, 2018, **7**, 2811-2820.
Photocatalytic decomposition	Bi_2WO_6	680 ppm of N_2O, 3 vol % O_2, and balance Ar, under the visible light irradiation (λ > 420 nm)	12.8% N_2O conversion after 12 h	J. Liu, L. Wang, W. Song, M. Zhao, J. Liu, H. Wang, Z. Zhao, C. Xu and Z. Duan, *ACS Sustainable Chem. Eng.*, 2018, **7**, 2811-2820.
Photocatalytic decomposition	g-C_3N_4/$BiVO_4$	Reactor filled with the N_2O/He mixture (1050 ppm) and P = 1.5 bar, 8 W Hg lamp under UVA irradiation (λ = 365 nm)	About 15 % N_2O conversion after 22 h	M. Reli, I. Troppová, M. Šihor, J. Pavlovský, P. Praus and K. Kočí, *Appl. Surf. Sci.*, 2019, **469**, 181-191.
Photocatalytic decomposition	TiO_2/C_3N_4	The reactor was filled with a N_2O/He mixture (968 ppm) and irradiated by an 8 W Hg lamp (λ = 254 nm; intensity =	57% N_2O conversion after 16 h	M. Reli, P. Huo, M. Šihor, N. Ambrožová, I. Troppová, L. Matějová, J. Lang, L. Svoboda, P. Kuśtrowski, M. Ritz, P. Praus

		0.5 mW/cm^2)		and K. Kočí, *J. Phys. Chem. A,* 2016, **120**, 8564-8573.
Photocatalytic decomposition	Nanobelt-like Bi_2MoO_6	N_2O = 0.68 vol. %, O_2 = 3 vol. %, Ar balance, under UVA irradiation (λ=365 nm)	21.7% N_2O conversion after 12 h	J. Tan, H. Cheng, J. Liu, J. Sun, Y. Li, H. Wang, J. Liu and Z. Zhao, *ChemistrySelect*, 2019, **4**, 5338-5344.
Photocatalytic decomposition	TiO_2/g-C_3N_4	N_2O/He mixture (1020 ppm), under UVC (λ= 254 nm) and UVA (λ= 365 nm) irradiation	More than 60% N_2O conversion after 14 h (λ = 254 nm); more than 60% N_2O conversion after 18 h (λ = 365 nm);	K. Kočí, M. Reli, I. Troppová, M. Šihor, J. Kupková, P. Kustrowski and P. Praus, *Appl. Surf. Sci.*, 2017, **396**, 1685-1695.
Photocatalytic decomposition	g-C_3N_4/$BiOIO_3$	N_2O/He mixture (1050 ppm) and P = 1.5 bar, under UVA irradiation (λ = 365 nm)	About 14 % N_2O conversion after 22 h	V. Matějka, M. Šihor, M. Reli, A. Martaus, K. Kočí, M. Kormunda and P. Praus, *Mater. Sci. Semicond. Process.*, 2019, **100**, 113-122.
Photocatalytic decomposition	g-C_3N_4/WO_3	998 ppm N_2O in He and P = 1.6 bar, under UVA irradiation at λ = 365 nm	About 15 % N_2O conversion after 20 h	M. Reli, L. Svoboda, M. Šihor, I. Troppová, J. Pavlovský, P. Praus and K. Kočí, *Environ. Sci. Pollut. Res.*, 2017, **25**, 34839-34850.
Photocatalytic decomposition	Ag-TiO_2	990 ppm N_2O/He mixture (volume 756 cm^3, pressure 110 kPa), 8 W Hg lamp with a peak light intensity at 254 nm	77% N_2O conversion after 24 h	K. Kočí, S. Krejčíková, O. Šolcová and L. Obalová, *Catal. Today*, 2012, **191**, 134-137.
Photocatalytic decomposition	Ce/TiO_2	968 ppm N_2O/He mixture (volume 182 mL, pressure 110 kPa), 8 W Hg lamp with a peak light intensity at 254 nm	About 85 % N_2O conversion after 18 h	L. Matějová, M. Šihor, J. Lang, I. Troppová, N. Ambrožová, M. Reli, T. Brunátová, L. Čapek, A. Kotarba and K. Kočí, *J. Sol-Gel Sci. Technol.*, 2017, **84**, 158-168.
Combined plasma catalysis	γ-Al_2O_3	300 ppm N_2O in N_2 at a rate of 100 mL min^{-1}, plasma voltage (12 – 22 kV)	T_{100} = 600 ºC in deN_2O; above 90%	L. S. Ko, Y. S. Chen, K. L. Pan and M. B. Chang, *Catal. Commun.*, 2023, **177**, 106666.
Combined plasma catalysis	RhFe/HAP-11	10 vol.% N_2O-He at a rate of 30 mL min^{-1}, plasma current (0.2 mA) and plasma voltage (20 kV)	95.9% N_2O conversion at 350 ºC in deN_2O; 90% N_2O conversion at 200 ºC	X. Tan, H. Chen, L. Shi, Q. Lu, S. Qi, C. Yi and B. Yang, *Catal. Lett.*, 2023, **153**, 3724–3733.
Combined plasma catalysis	Ru/γ-Al_2O_3	450 ppm N_2O, 10% O_2 at a rate of 1 L min^{-1}, plasma voltage 25.6 kV	Above 70% N_2O conversion at 300 ºC	J.-O. Jo, Q. H. Trinh, S. H. Kim and Y. S. Mok, *Catal. Today*, 2018, **310**, 42-48.
Microwave-assisted experimental	NiCoAl/SiC	20 vol.% N_2O in Ar, WHSV = 5 h^{-1} or 20 h^{-1}, microwave heating	T_{100} = 420 ºC (20 h^{-1}); T_{100} = 340 ºC (5 h^{-1})	O. Muccioli, E. Meloni, S. Renda, M. Martino, F. Brandani, P. Pullumbi and V. Palma, *Processes*, 2023, **11**, 1511.
Electrochemical reduction	Working electrode: Ir (100) (110) (111)	1) Electrolyte: 0.1 M $HClO_4$; 2) N_2O saturated solution	1) Ir (110): ~0.75 mA cm^{-2} (0.1 V_{RHE}); 2) Ir (111): ~0.85 mA cm^{-2} (0.1	R. Gomez and M. J. Weaver, *Langmuir,* 2002, **18**, 4426-4432.

			V_{RHE})	
Electrochemical reduction	Cathode: Metal wire (Zn, Pb, Fe, Cu) wound around a polyelectrolyte-coated porous glass tube	1) Electrolyte: 5% Nafion® 117 solution; 2) 17.7 mmol N_2O, 3-13 mL min^{-1}; Electrolysis time=6-8 h; Applied current density=1.4-12.8 mA cm^{-2}	Max N_2O reduction efficiency (6 h, 6 mL min^{-1}): Zn: 99.3% (12.8 mA cm^{-2}); Pb: 98.8% (12.8 mA cm^{-2}); Fe: 95.7% (12.8 mA cm^{-2}); Cu: 93.0% (7.1 mA cm^{-2})	K. Kanazawa, H. Yamamura, M. Nakayama and K. Ogura, *J. Electroanal. Chem.*, 2002, **521**, 127-131.
Electrochemical reduction	Working electrode: $OsPtCl_6$ film deposited on glassy carbon electrode	1) Electrolyte: 0.1 M KCl and 0.01 M H_2PO_4; 2) N_2O mixed with N_2, the percentage of N_2O=0, 30, 70, 100	Onset potential=0.67 V_{RHE}	S.M. Chen, S.H. Li and R. Thangamuthu, *Electroanalysis*, 2009, **21**, 1505-1513.
Electrochemical reduction	Cathode: Cone-shaped electrodes of $La_{1-x}Sr_xFeO_3$ perovskites	1) Electrolyte: Yttria Stabilized Zirconia; 2) 1% N_2O in Ar (20 mL min^{-1}); Temperature: 350, 400 and 450℃	0.023 mA cm^{-2} (0.4 V_{RHE}, 400 ℃)	K. K. Hansen, Mater. *Res. Bull.*, 2010, **45**, 1334-1337.
Electrochemical reduction	Homogeneous catalyst: 15 μM CoMb; Working electrode: Carbon cloth electrode	1) Electrolyte: 80 mL of 50 mM phosphate buffer with CoMb (15 μM) and methyl viologen (2 mM); 2) 9 mL $^{14}N–N_2O$ (100%) and 6 mL $^{15}N–N_2O$ (100%) added into the headspace of the electrochemical cell; Electrolysis time=20 min	1) Total N_2: 11.3 to 19.6 μmol; 2) ^{15}N-N_2: 41 to 72 nmol; 3) The ratio of $^{15}N–N_2$ to $^{14}N–N_2$: 1.57 × $10^{−5}$ to 3.42 × $10^{−5}$	T. D. Rapson, S. Warneke, M. M. Musameh, H. Dacres, B. C. T. Macdonald and S. C. Trowell, *RCS Adv.*, 2015, **5**, 89003-89008.
Electrochemical reduction	Working electrode: Porous In/Cu foam electrode	1) Electrolyte: 0.5 M NaOH; 2) N_2O saturated electrolyte solution and continued purging; Electrolysis time=5 h	1) 25 mA cm^{-2} (-0.75 V_{RHE}); 2) ~100% N_2 Faradaic efficiency	K. H. Kim, T. Lim, M. J. Kim, S. Choe, S. Baek and J. J. Kim, *Electrochem. Commun.*, 2016, **62**, 13-16.
Electrochemical reduction	Working electrode: $Pd_{60}Cu_{40}$ Catalyst coated on glassy carbon electrode	1) Electrolyte: 0.2 M KOH and 0.3 M K_2SO_4; 2) N_2O saturated electrolyte solution and continued purging	1) 6.0 mA cm^{-2} (0.04 V_{RHE}); 2) Tafel slope=0.096 V dec^{-1}	S. Baek, K. Kim, O. S. Kwon, H. Kim, J. W. Han, O. J. Kwon and J. J. Kim, J. *Appl. Electrochem*., 2020, **50**, 395-405.
Electrochemical reduction	Working electeode: Au@Pd Core shell structure catalyst coated on RED	1) Electrolyte: 0.3 M KOH and 0.2 M K_2SO_4; 2) N_2O saturated electrolyte solution and continued purging	1) 0.472 mA cm^{-2} (-0.3 V_{SCE}); 2) Tafel slope=0.105 V dec^{-1}; 3) Current density decreased 16% after 1000 cycles	K. Kim, J. Byun, H. Kim, K.-S. Lee, H. S. Lee, J. Kim, T. Hyeon, J. J. Kim and J. W. Han, *ACS Catal.*, 2021, **11**, 15089-15097.
Electrochemical reduction	Homogeneous catalyst: 0.5 mM $Re(bpy)(CO)_3Cl$; Working electrode: RED	1) Electrolyte: CH_3CN/H_2O=90/10; 2) N_2O saturated electrolyte solution and continued purging; Electrolysis time=90 min	1) 7.5 mA cm^{-2} (-1.72 V_{SCE}); 2) Max N_2 percentage obtained=29.5%	R. Deeba, F. Molton, S. Chardon-Noblat and C. Costentin, *ACS Catal.*, 2021, **11**, 6099-6103.
Electrochemical reduction	Cathode: High surface area metallic Cu electrode	1) Electrolyte: 0.1 M KOH; 2) Cathode gas=N_2O or Ar; Anode gas=Ar (20 mL min^{-1})	1) 10.0 mA cm^{-2} (-0.2 V_{RHE}); 2) N_2 Faradaic efficiency=83.3%; 3) Tafel slope=0.124 V dec^{-1}	S. Nilvichean, K. Meesombad, T. Butburee, P. Chakthranont and R. Methaapanon, *React. Chem. Eng.*, 2022, **8**, 84-95.
Electrochemical reduction	Working electrode: Pt/Pd deposited on fluorine-doped	1) Electrolyte: 0.1 M $HClO_3$; 2) N_2O saturated solution	–0.25±0.04 mA cm^{-2} (0.16 V_{RHE})	A. C. Sarker, M. Kato and I. Yagi, *Electrochim. Acta*, 2022, **425**, 140628.

	tin oxide (FTO) electrode			
Electrochemical reduction	Working electrode: $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ (LSCF)	1) Electrolyte: 8YSZ $((ZrO_2)_{0.92}(Y_2O_3)_{0.08})$ substrate; 2) >99.5% purity of N_2O with N_2 <0.4% (50 mL min^{-1}); Temperature: 600, 700 and 800℃; Current: -0.10 A and -0.25 A	1) Faradaic Efficiency=8.95; 2) Conversion increment=13.15 (-0.25 A, 600℃)	L. I. V. Holz, F. J. A. Loureiro, A. J. M. Araujo, V. C. D. Graca, D. Mendes, A. Mendes and D. P. Fagg, *Int. J. Energ. Res.*, 2022, **46**, 22038-22048.
Electrochemical reduction	Homogeneous catalyst: $[Re(bpy)(CO)_3X]^{n+}$ (X=CH_3CN, Cl^-, n =0 or 1); Working electrode: RED	1) Electrolyte: CH_3CN+0.1 M *n*-NBu_4PF_6; 2) CH_3CN solution of saturated N_2O, 1.5 mM N_2O; Constant potential=-1.22 V; Electrolysis time=4 h	N_2 Faradaic efficiency=90%	R. Deeba, S. Chardon-Noblat and C. Costentin, *ACS Catal.*, 2023, **13**, 8262-8272.
Electrochemical reduction	Cathode: $Sr_2Fe_{1.5}Mo_{0.5}O_{6-\delta}$ (SFMO)	1) Electrolyte: 8YSZ substrate; 2) >99.5% purity of N_2O with N_2 <0.4% (50 mL min^{-1}); Temperature: 600, 700 and 800℃; Current: -0.10 A and -0.25 A (50 mL min^{-1})	1) Faradaic Efficiency=3.94; 2) Conversion increment=5.01 (-0.25 A, 600℃)	L. I. V. Holz, F. J. A. Loureiro, V. C. D. Graça, S. M. Mikhalev, C. Fernandes, A. Mendes and D. P. Fagg, *Int. J. Hydrogen Energy* **2023**, *5*, 251.
Electrochemical reduction	Homogeneous catalyst: Iron tetraphenylporphyrin (FeTPP); Working electrode: Carbon fabric	1) Electrolyte: 1 mM FeTPPCl and 0.1 M *n*-Bu_4NPF_4 in tetrahydrofuran (THF) solution with 20 equivalents of water; 2) N_2O saturated solution; Applied potential=-2.3 V vs $Fe(C_5H_5)^{2+/0}$; Electrolysis time=2.2 h	1) Average Faradaic yield: 100.1% (Standard deviation of 4.7%); 2) Reaction rate=12.6 s^{-1}	J. S. Stanley, X. S. Wang and J. Y. Yang, *ACS Catal.*, 2023, **13**, 12617-12622.
Electrochemical reduction	Working electrode: Polycrystalline Cu	1) Electrolyte: 0.3 M K_2SO_4 or Na_2SO_4; 2) N_2O-saturated electrolyte solution and continued purging	1) K_2SO_4: -43.75 mA cm^{-2}; 2) Na_2SO_4: -33 mA cm^{-2}; (-1.4 V_{SCE})	O. S. Kwon, S. Baek, H. Kim, I. Choi, O. J. Kwon and J. J. Kim, *Electroanalysis*, 2019, **31**, 739-745.
Electrochemical reduction	Working electrode: Cu foil	1) Electrolyte: 75 vol% 1-butyl-3-methylimidazolium tetrafluoroborate ([BMIM][BF_4]) ionic liquid and propylene carbonate (PC) organic solvent or 0.3 M K_2SO_4; 2) N_2O-saturated electrolyte solution and continued purging; -2.27 V (vs. Fc/Fc^+) in [BMIM][BF_4]/PC and -1.3 V_{SCE}	1) N_2 Faradaic efficiency: 90.9% in [BMIM][BF_4]/PC, 41.0% in K_2SO_4; 2) Current efficiency variation within 1800 s: remain over 95% in [BMIM][BF_4]/PC and decreased from 83.9% to 49.6% in K_2SO_4	H. Kim, S. Baek, T. Lim and J. J. Kim, *Electrochem. Commun.*, 2020, **113**, 106688.
Electrochemical reduction	Cathode: silver solid amalgam electrode (AgSAE)	1) Electrolyte: Anolyte: 5 M H_2SO_4; Catholyte: 0.05 M Ni(Ⅱ)CN_4^{2-} and 9 M KOH; 2) 20 ppm N_2O by Ar diluted gas (1 L min^{-1}); Current density=25 mA cm^{-2}; Constant electrolysis time≥6 h	N_2O removal efficiency=99.8%	P. Silambarasan, A. G. Ramu, M. Govarthanan, K. D. Jung and I. S. Moon, *J. Hazard. Mater.*, 2021, **420**, 126564.
Electrochemical reduction	Working electrode: polycrystalline Pt and Pd	1) Electrolyte: 0.1 M NaOH or 0.1 M NaOH and 0.5 M or 1 M CH_3OH;	Tafel slope: Pt=0.111 ± 0.019 V dec^{-1}, Pd=0.084 ± 0.007 V	A. Aziznia, A. Bonakdarpour, E. L. Gyenge and C. W. Oloman, *Electrochim.*

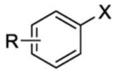
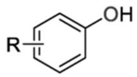
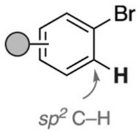
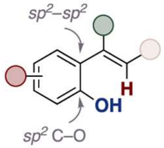
	electrodes	2) N_2O saturated electrolyte solution and continued purging; Temperature: 295 K and 333 K; Electrode rotation speed 0-3600 rpm	dec^{-1} (0.1 M NaOH, 295 K; 1600 rpm, 0.01 V s^{-1})	*Acta*, 2011, **56**, 5238-5244.
Electrochemical reduction	Cathode: Cu; Scrubbing electrocatalyst: Ni(Ⅰ)TSPc	1) Electrolyte: Anolyte: 1 M H_2SO_4, Catholyte: 1 M KOH with 1 mM Ni(Ⅱ)TSPc; 2) 5-30 ppm N_2O by Ar diluted gas; 30 mA cm^{-2}; Reaction period: 5-20 min	N_2O removal efficiency: 100% (5 ppm N_2O), 90% (10 ppm), 65% (20 ppm), 45% (30 ppm)	P. Silambarasan and I. S. Moon, *Environ. Res.*, 2022, **204**, 111912.
Electrochemical reduction	Cathode: Metal catalysts (Depositing Fe, Co, Ni, Cu, Pd, Ag, Pt particles onto gas diffusion layer)	1) Electrolyte: 0.1 M NaOH and 0.9 M $NaClO_4$; 2) Gas-fed three-compartment flow cell; N_2O flow (10 mL min^{-1})	N_2 Faradaic efficiency: Co: 91.4% (-0.19 V_{RHE}); Cu: 91.7% (-0.31 V_{RHE}); Ag: 94.3% (-0.37 V_{RHE})	B. H. Ko, B. Hasa, H. Shin, Y. Zhao and F. Jiao, *J. Am. Chem. Soc.*, 2022, **144**, 1258-1266.
Electrochemical reduction	Anode: $Pr_{0.6}Sr_{0.4}Fe_{0.8}Nb_{0.1}Cu_{0.1}O_{3-\delta}$ Cathode: $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$	N_2O flow (80 mL min^{-1})	1) N_2O conversion efficiency=19.0%; 2) Ethane conversion efficiency=45.2%; 3) Ethylene selectivity=92.5%	S. Lei, A. Wang, G. Weng, Y. Wu, J. Xue and H. Wang, *J. Energy. Chem.*, 2023, **77**, 359-368.

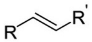
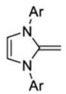
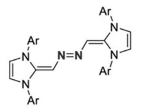
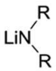
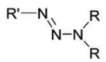
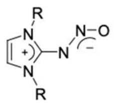
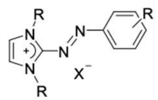
** T_{50} is temperature at which N_2O conversion reached 50%; T_{90} is temperature at which N_2O conversion reached 90%; T_{100} is temperature at which N_2O conversion reached 100%; r_{N2O} is N_2O reaction rate

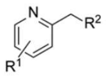
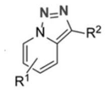
** “NA” represents no specific indication or not involved in the research.

*** Except exceptionally indicated, the reaction conditions are ambient temperature and pressure, i.e., 25 °C and 101 KPa.

Table S2. Summary of representative studies for N_2O valorization.

The role of N_2O	Reaction substrate	Final products	Catalyst	Reaction conduction	Efficiency	Ref.
O-atom donor: Benzene oxidation to phenol	C_6H_6	C_6H_5OH	Fe-MFI zeolites of alumosilicate (AS), borosilicate (BS) and titanosilicate (TS) composition	375 ℃; 5.5 mol% N_2O, 50 mol% C_6H_6, 2 mL s^{-1}; Time=15 min	1) Conversion: 0.9%-1.5% for C_6H_6, 11-16% for N_2O; 2) Selectivity: C_6H_6>99%, N_2O >70%	V. S. Chernyavsky, L. V. Pirutko, A. K. Uriarte, A. S. Kharitonov and G. I. Panov, *J. Catal.*, 2007, **245**, 466-469.
O-atom donor: Benzene oxidation to phenol	C_6H_6	C_6H_5OH	Fe/ZSM-5-Hix-F	425 ℃; 5 mol% N2O and 50 mol% C_6H_6 in He; Time=3-30 h	1) Conversion: 100% for N_2O; 2) Selectivity of C_6H_6=93.3%; 3) C_6H_5OH formation rate=16.49 ± 0.06 $mmol_{phenol}$ $g_{catalyst}^{-1}$ h^{-1}; 4) C_6H_5OH productivity=0.44 ton_{phenol} $kg_{catalyst}^{-1}$	J. Chen, R. Yin, G. Chen, J. Lang, X. Chen, X. Chu and J. Li, *Green. Energy. Environ.*, 2023, **8**, 4-9.
O-atom donor: Benzene oxidation to phenol	 X = I, Br		Bipyridine-supported Ni(II) complex	25 ℃; 1.5–2 bar N_2O	73% yield of phenol	F. Le Vaillant, A. Mateos Calbet, S. González-Pelayo, E. J. Reijerse, S. Ni, J. Busch and J. Cornella, *Nature*, 2022, **604**, 677-683.
O-atom donor: Benzene oxidation to phenol			1, 4-Ni shift	60 °C; 2 atm N_2O; Time=48 h	Max yield=87%	H. Zhang, J. Rodrigalvarez and R. Martin, *J. Am. Chem. Soc.*, 2023, **145**, 17564-17569.
O-atom donor: Oxidation of alkanes to oxygenated organics	CH_4	CH_3OH, CH_3OCH_3, CH_2O, C_2H_4	Fe-ferrierite (Fe-FER)	250-350 ℃; CH_4/N_2O=0.5-6.0	CH_4/N_2O=0.5: 1) Methane conversion=57%; 2) Selectivity to valuable products=24.4%	G. Zhao, A. Adesina, E. Kennedy and M. Stockenhuber, *ACS Catal.*, 2020, **10**, 1406-1416.
O-atom donor: Oxidation of alkanes to oxygenated organics	C_3H_8	Propene oxide	V/SBA-3	400 ℃ and 430 ℃; C_3H_8/N_2O/He=1/15/12/5; Time=2 h, contact time=2.1 s	1) C_3H_8 conversion=50% (400 ℃); 2) Propene oxide selectivity from propene=~20% (400 ℃)	A. Held, J. Kowalska-Kuś and K. Nowińska, *J. Catal.*, 2016, **336**, 23-32.
O-atom donor: Oxidation of alkanes to oxygenated organics	Cyclohexane	Cyclohexanol and cyclohexanone	PMo_{12-n} V n , n =1–3	Visible light-triggered; 1 atm N_2O; 1 mmol cyclohexane.	1) Selectivity of cyclohexanol and cyclohexanone =90.2%; 2) Selectivity of cyclohexanone=82.7%; 2) Cyclohexane conversion	J. She, Z. Fu, J. Li, B. Zeng, S. Tang, W. Wu, H. Zhao, D. Yin and S. R. Kirk, *Appl. Catal. B Environ.*, 2016, **182**, 392-404.

					rate=26.2%	
O-atom donor: Oxidation of olefins to ketones and aldehydes	Propane-propylene mixture	Acetone, propionaldehyde, and acetaldehyde	NA	450 °C and 0.7 MPa; 15 mol % propane and 85 mol % propylene	1) N_2O conversion rate=74.5%; 2) Propylene conversion rate=12.5%; 3) Selectivity of acetone, propionaldehyde, and acetaldehyde=74.6%; 4) Selectivity of methylcyclopropane=6%.	K. A. Dubkov, M. V. Parfenov and A. S. Kharitonov, *Ind. Eng. Chem. Res.*, 2020, **59**, 14157-14162.
O-atom donor: Oxidation of olefins to ketones and aldehydes	Butene–butane mixture (BBM)	Methyl ethyl ketone (MEK)	NA	220–260 °C; 5-8 MPa; 0.093 mol BBM and 0.093 mol N_2O; Solvent: *n*-hexadecane; Time=6-12 h	1) MEK selectivity=45.9%-47.2%; 2) Total selectivity to ketones/aldehydes=87%	S. V. Semikolenov and K. A. Dubkov, *Ind. Eng. Chem. Res.*, 2023, **62**, 9153-9158.
O-atom donor: Oxidation of olefins to ketones and aldehydes	 R=R'=Alkyl, Aryl, H		$[Mn^{III}_2ZnW(ZnW_9O_{34})_2]^{10-}$	150 °C;1 atm N_2O; 1 mmol of substrate; 0.01 mmol catalyst; 1 mL of fluorobenzene; Time=18 h	Selective epoxidation of alkenes >99.9%	R. Ben-Daniel, L. Weiner and R. Neumann, *J. Am. Chem. Soc.*, 2002, **124**, 8788-8789.
N-atom donor	 Ar=Dipp, Mes, Xyl		NA	25 ℃; N_2O (~50 mL, 1 bar) was added at 0°C; Tme=48 h	Yield: 43%-96%	Eymann, L. Y. M.; Varava, P.; Shved, L. Y. M. Eymann, P. Varava, A. M. Shved, B. F. E. Curchod, Y. Liu, O. M. Planes, A. Sienkiewicz, R. Scopelliti, F. Fadaei Tirani and K. Severin, *J. Am. Chem. Soc.*, 2019, **141**, 17112-17116.
N-atom donor			R'MgX	25 ℃ or 50 ℃; N_2O dissolved in THF; Time=4 and 18 h	Yield =68%-100% (4 h, 50 ℃), 65%-100% (18 h, 50 ℃), 9%-98% (4 h, 50 ℃), 13%-95% (18 h, 50 ℃)	G. Kiefer, T. Riedel, P. J. Dyson, R. Scopelliti and K. Severin, *Angew. Chem. Int. Ed.*, 2015, **54**, 302-305.
N-atom donor	 (R=Mes, *i*Pr, Me)	 X^-=BPh_4^- or ClO_4^-	Arenes and $AlCl_3$	Aromatic coupling partners: C_6H_5F, heterocycles, and polymers; 2 equiv $AlCl_3$ and 1 equiv R-N_2O	Yield=52%-94%	A. G. Tskhovrebov, L. C. E. Naested, E. Solari, R. Scopelliti and K. Severin, *Angew. Chem. Int. Ed.*, 2015, **54**, 1289-1292.

N-atom donor			NA	50 ℃; Under N_2O atmosphere (3x N_2O/*vac* cycles); 1.1 equiv *n*-BuLi and 0.05 M THF; Time=2 h	Conversion efficiency of triazolopyridines >95%	I. R. Landman, F. Fadaei-Tirani and K. Severin, *Chem. Commun.*, 2021, **57**, 11537-11540.
Oxidant for oxidative dehydrogenation	C_6H_{12}	C_6H_{10} and C_6H_6	PCN-250 (Fe_2Mn, Fe_3, Fe_2Co and Fe_2Ni)	250 °C; N_2O (5 mL min^{-1}, 1%, Airgas); Time=8 h	Selective of C_6H_{10}: PCN-250 (Fe_3) and PCN-250 (Fe_2Mn)=~100%; PCN-250 (Fe_2Co) and PCN-250 (Fe_2Ni)=93%-95%	M. Barona, S. Ahn, W. Morris, W. Hoover, J. M. Notestein, O. K. Farha and R. Q. Snurr, *ACS Catal.*, 2020, **10**, 1460-1469.
Oxidant for oxidative dehydrogenation	C_2H_6	C_2H_4	Sulfate-Modified NiAl	480-600 ℃; 2 vol % C_2H_6 and 2 vol % N_2O in He (30 mL min^{-1})	1) C_2H_6 conversion=52%; 2) C_2H_4 Selectivity = ~100%;	Y. Zhou, F. Wei, J. Lin, L. Li, X. Li, H. Qi, X. Pan, X. Liu, C. Huang, S. Lin and X. Wang, *ACS Catal.*, 2020, **10**, 7619-7629.
Oxidant for oxidative dehydrogenation	Ethylbenzene	Styrene	K/Co_2AlO_4	500 ℃; Molar ratio of N_2O/ Ethylbenzene=3 (150 mL min^{-1}); Time=1-6 h	1) Ethylbenzene conversion=62.0%; 2) N_2O conversion=~100% 3) Styrene selectivity=85.1%;	Z. Liu, Y. Li, X. Sun, Z. Sui and X. Xu, *J. Ind. Eng. Chem.*, 2022, **112**, 67-75.
Oxidant for oxidative dehydrogenation	Cyclohexanol	Cyclohexanon e	1% Cu-decatungstate (DT) catalyst	25 ℃; 1 atm; visible light illumination; substrate concentration=1 M; 0.012 mM catalyst.	1) Yield=46.3%; 2) Turnover frequency (TOF)=6.56 h^{-1}	J. Zhu, B. Yang, Y. Deng, M. Chen, H. Wang, A. Wang, W. Gao, J. She, M. Luo, Y. Liu and Z. Fu, *Appl. Catal. B-Environ.*, 2022, **318**, 121861.
Oxidant for oxidative dehydrogenation	CH_4	C_2 hydrocarbons	Mn-Na_2WO_4/SiO_2	800 ℃; 40 vol % CH_4 and 10 vol % N_2O in a He/Ne = 9:1 mixture (30 mL min^{-1})	Methane conversion into C_2 hydrocarbons >1	Z. Aydin, A. Zanina, V. A. Kondratenko, J. Rabeah, J. Li, J. Chen, Y. Li, G. Jiang, H. Lund, S. Bartling, D. Linke and E. V. Kondratenko, *ACS Catal.*, 2022, **12**, 1298-1309.
Oxidant for oxidative dehydrogenation	R-MgX (R=aryl, alkenyl, alkyl; X=Cl, Br)	R-R	Li_2CuCl_4, Li_2MnCl_4, $CoCl_2$,$FeCl_3$,Fe(ac ac)$_3$	25 ℃; 1 mol% catalyst; Time=1 h	Yield=30-95%, 95% ($CoCl_2$); 94% ($FeCl_3$, [Fe(acac)$_3$])	G. Kiefer, L. Jeanbourquin and K. Severin, *Angew. Chem. Int. Ed.*, 2013, **52**, 6302-6305.

* "NA" represents no specific indication or not involved in the research.