

Absorption and oxidation of nitrogen oxide in ionic liquids - DTU Orbit (09/11/2017)

Absorption and oxidation of nitrogen oxide in ionic liquids

A new strategy for capturing nitrogen oxide, NO, from the gas phase is presented. Dilute NO gas is removed from the gas phase by ionic liquids under ambient conditions. The nitrate anion of the ionic liquid catalyzes the oxidation of NO to nitric acid by atmospheric oxygen in the presence of water. The nitric acid is absorbed in the ionic liquid up to approximately one mole HNO₃ per mole of the ionic liquid due to the formation of hydrogen bonds. The nitric acid can be desorbed by heating, thereby regenerating the ionic liquid with excellent reproducibility. Here, time-resolved in-situ spectroscopic investigations of the reaction and products are presented. The procedure reveals a new vision for removing the pollutant NO by absorption into a non-volatile liquid and converting it into a useful bulk chemical, that is, HNO₃.

General information

State: Published

Organisations: Department of Chemistry, Organic Chemistry, Centre for Catalysis and Sustainable Chemistry, Center for Hyperpolarization in Magnetic Resonance

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Number of pages: 11

Pages: 11745-11755

Publication date: 2016

Main Research Area: Technical/natural sciences

Publication information

Journal: Chemistry: A European Journal

Volume: 22

Issue number: 33

ISSN (Print): 0947-6539

Ratings:

BFI (2017): BFI-level 2

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 2

Scopus rating (2016): CiteScore 5.03 SJR 2.247 SNIP 1.046

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 2

Scopus rating (2015): SJR 2.416 SNIP 1.184 CiteScore 4.99

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 2

Scopus rating (2014): SJR 2.487 SNIP 1.219 CiteScore 5.51

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 2

Scopus rating (2013): SJR 2.604 SNIP 1.239 CiteScore 5.68

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 2

Scopus rating (2012): SJR 2.884 SNIP 1.294 CiteScore 5.55

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 2

Scopus rating (2011): SJR 2.726 SNIP 1.336 CiteScore 5.46

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 2

Scopus rating (2010): SJR 2.527 SNIP 1.292

Web of Science (2010): Indexed yes

BFI (2009): BFI-level 2

Scopus rating (2009): SJR 2.499 SNIP 1.365

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 2

Scopus rating (2008): SJR 2.887 SNIP 1.407

Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 3.233 SNIP 1.532
Scopus rating (2006): SJR 2.911 SNIP 1.505
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.62 SNIP 1.454
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.32 SNIP 1.472
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 2.156 SNIP 1.45
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 2.554 SNIP 1.472
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 2.834 SNIP 1.612
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 2.956 SNIP 1.652
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 3.013 SNIP 1.73

Original language: English

Gas absorption, Ionic liquids, IR spectroscopy, Nitric acid, NOx

Electronic versions:

Fehrmann_June2016.pdf. Embargo ended: 08/07/2017

DOIs:

[10.1002/chem.201601166](https://doi.org/10.1002/chem.201601166)

Publication: Research - peer-review › Journal article – Annual report year: 2016