

Accepted Manuscript

Title: Transient *operando* study on the $\text{NH}_3/\text{NH}_4^+$ interplay in V-SCR monolithic catalysts

Authors: Søren B. Rasmussen, Raquel Portela, Philippe Bazin, Pedro Ávila, Miguel A. Bañares, Marco Daturi



PII: S0926-3373(17)31000-7
DOI: <https://doi.org/10.1016/j.apcatb.2017.10.026>
Reference: APCATB 16106

To appear in: *Applied Catalysis B: Environmental*

Received date: 13-7-2017
Revised date: 4-10-2017
Accepted date: 11-10-2017

Please cite this article as: Søren B. Rasmussen, Raquel Portela, Philippe Bazin, Pedro Ávila, Miguel A. Bañares, Marco Daturi, Transient *operando* study on the $\text{NH}_3/\text{NH}_4^+$ interplay in V-SCR monolithic catalysts, *Applied Catalysis B, Environmental* <https://doi.org/10.1016/j.apcatb.2017.10.026>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Transient *operando* study on the $\text{NH}_3/\text{NH}_4^+$ interplay in V-SCR monolithic catalysts

Søren B. Rasmussen,^{1,2,*}, Raquel Portela^{1,2}, Philippe Bazin², Pedro Ávila¹, Miguel A. Bañares^{1,2} and Marco Daturi^{2*}

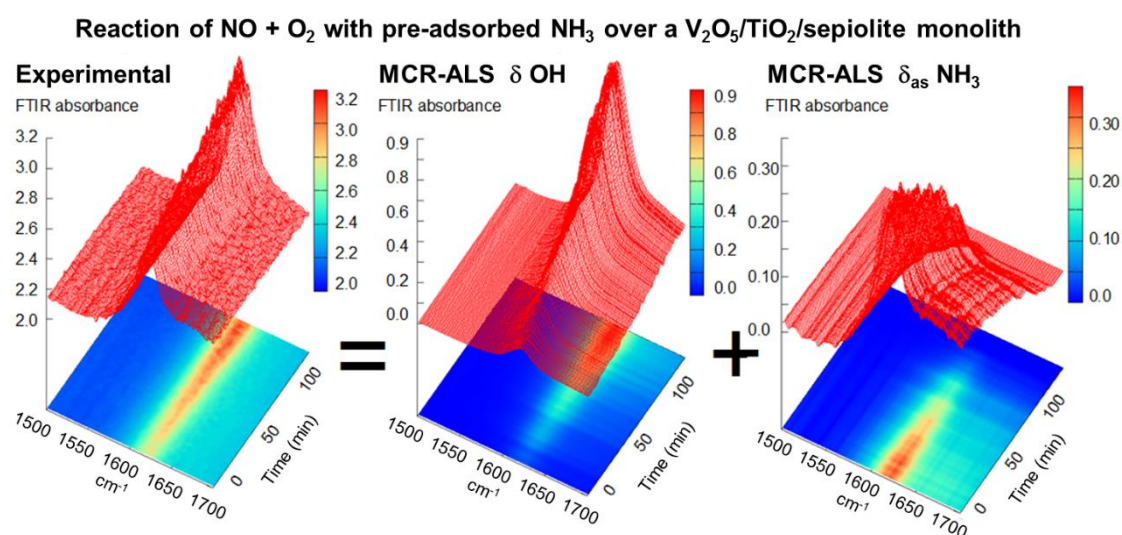
¹Spectroscopy and Industrial Catalysis, Instituto de Catálisis y Petroleoquímica, CSIC, Marie Curie 2, E-28049, Madrid, **SPAIN**

²Normandie Univ., ENSICAEN, UNICAEN, CNRS, Laboratoire Catalyse et Spectrochimie, 14000 Caen, **FRANCE**

*Present address: Haldor Topsøe A/S, Haldor Topsøes Allé 1, DK-2800 Kgs. Lyngby, **DENMARK**

Marco.Daturi@ensicaen.fr, sobr@topsoe.dk

Graphical abstract



Highlights

- Transmission IR *operando* rig to follow NH_3 -to- $\text{NO}+\text{O}_2$ transient on V-SCR honeycomb
- Chemometrics resolves adsorbed H_2O and NH_3 contributions to $\sim 1620\text{ cm}^{-1}$ IR band
- Water formed upstream hydrolyzes dispersed vanadia creating Brønsted acid sites
- Spatial effects in integral reactor complement fundamental observations on powder

1 Abstract

The assessment of an integral catalytic reactor facilitating *operando* spectroscopic measurements on a monolith has been carried out using NH_3 -SCR on a vanadia-based catalyst as a probe reaction. The NH_3 -SCR mechanism is revisited by studying the adsorbed ammonia and ionically bound ammonium ions and their relations to Lewis and Brønsted acid sites during reaction. The simultaneous presence of molecular water and ammonia adsorbed on the surface is intrinsic to low temperature NH_3 -SCR, and their IR absorption bands overlap in the bending region around 1600 cm^{-1} . This has to be tackled in order to genuinely reproduce real reaction conditions and simultaneously extract relevant spectroscopic data of a working

Download English Version:

<https://daneshyari.com/en/article/6498697>

Download Persian Version:

<https://daneshyari.com/article/6498697>

[Daneshyari.com](https://daneshyari.com)