

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

U.S. Patent No. 7,601,662

U.S. Patent No. 8,404,203

Filed: Feb. 27, 2008

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Issued: Oct. 13, 2009

Issued: Mar. 26, 2013

Inventors: Ivor Bull, et al.

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Title: Copper CHA Zeolite Catalysts

Title: Processes for Reducing Nitrogen Oxides Using Copper CHA Zeolite Catalysts

DECLARATION OF DR. MICHAEL TSAPATSI

I, Michael Tsapatis, make this declaration in connection with the *Inter Partes* Reviews of U.S. Patent Nos. 7,601,662 (“the 662 Patent”) (IPR2015-01121, -1125) and 8,404,203 (“the 203 Patent”) (IPR2015-01123, -1124). All statements herein made of my own knowledge are true, and all statements herein made based on information and belief are believed to be true. I am over age 21 and otherwise competent to make this declaration. Although I am being compensated for my time in preparing this declaration, the positions articulated herein are my own, and I have no stake in the outcome of this proceeding or any related litigation or administrative proceedings.

I. Background and Qualifications

1. Appendix A to this declaration is my *curriculum vitae*. As shown in my *curriculum vitae*, I have devoted my career to various fields of zeolite catalysts and adjacent fields of research. From 2008 to 2013, I served as an Editor for *Microporous and Mesoporous Materials*, which is the official journal of the International Zeolite Association. In 2013, I was elected as a council member of the International Zeolite Association.

2. I am a Professor at the University of Minnesota Twin Cities and am the Amundson Chair in Chemical Engineering and Materials Science at the University of Minnesota Twin Cities. At the University of Minnesota Twin Cities, I lead the Tsapatsis Research Group, which is housed in the department of Chemical Engineering & Materials Science. The research of the Tsapatsis Research Group is focused on innovative research on, among other things, highly selective membranes and catalysts with properties tailored for specific purposes. In the course of this research, we have substantial interactions with those in the relevant industries. I have worked on zeolite synthesis, structure determination and applications in separations and catalysis for 25 years. I have supervised more than 30 Ph.D. theses and 20 post-doctoral studies, and graduates from my group are employed in the chemical, petrochemical and microelectronics industries while 18 former students and postdoctoral fellows hold academic positions.

3. I received a diploma in Chemical Engineering from the University of Patras in Greece. Following this, I received my MS in Chemical Engineering from the California Institute of Technology in 1991 and my Ph.D. in Chemical Engineering from the California Institute of Technology in 1994. In 1994, I continued my post-doctoral research and training in Chemical Engineering at the California Institute of Technology. From 1994 to 1999, I was an Assistant Professor at the University of Massachusetts in Amherst. Thereafter, I was awarded early tenure and became an Associate Professor at the University of Massachusetts from 1999 to 2003. From 2003 to present, I have been a Professor at the University of Minnesota Twin Cities and have held the Amundson chair since 2008.

4. I have published approximately 220 papers and have been invited to present approximately 140 lectures including for ExxonMobil (UMass Amherst), Lindsay (Texas A&M), Merck Sharp and Dohme (UPR), Van Ness (RPI), Robert W. Vaughan (Caltech), DB Robinson (Alberta), SV Sotirchos (Foundation for Research and Technology, Greece) and GCA Schuit Lectures (Delaware).

5. I am the inventor/co-inventor of 10 issued patents and 7 patent applications. I am the recipient of the Alpha Chi Sigma Award for Chemical Engineering Research from the American Institute of Chemical Engineers (AIChE), the Breck Award from the International Zeolite Association (co-awarded

in 2013 with Prof. Caro), the Charles M.A. Stine Award from the Materials Engineering & Sciences Division of AIChE, a David and Lucile Packard Foundation Fellowship, a National Science Foundation CAREER Award, a Camille Dreyfus Teacher-Scholar Award and of a North American Membrane Society Fellowship. I was elected fellow of the American Association for the Advancement of Science (2011) and a member of the National Academy of Engineering (2015) with Election Citation: *For design and synthesis of zeolite-based materials for selective separation and reaction.*

A. Status as an Independent Expert Witness

6. I have been retained in this matter by BASF Corporation to provide expert analysis and opinions regarding the 662 and 203 Patents. I am being compensated at the rate of \$300 per hour for my work. My fee is not contingent on the outcome of this matter or on any of the positions I have taken, as discussed below. I have no financial interest in BASF Corporation.

7. I have been advised that Umicore AG & Co. KG (hereinafter referred to as “Petitioner”) is challenging the validity of the 662 and 203 Patents. I have no financial interest in Petitioner.

II. Materials Considered

8. I have reviewed the 662 and 203 Patents and their respective prosecution histories. I have also reviewed the following documents:

Petitioner's Exhibits	
Exhibit 1002	U.S. 4,046,888 to Maeshima
Exhibit 1003	U.S. 4,503,023 to Breck
Exhibit 1004	U.S. 6,709,644 to Zones
Exhibit 1005	U.S. Pat. App. Pub. 2006/0039843 to Patchett
Exhibit 1006	U.S. Pat. App. Pub. 2005/0031514 to Patchett
Exhibit 1007	Dedecek et al., "Siting of the Cu ⁺ Ions in Dehydrated Ion Exchanged Synthetic and Natural Chabasites: a Cu ⁺ Photoluminescence Study," Microporous and Mesoporous Materials, Vol. 32, pp. 63-74 (1999).
Exhibit 1008	Expert Declarations of Dr. Lercher submitted in IPR2015-01121, -01123, -01124, -01125
Exhibit 1010	U.S. 4,961,917 to Byrne
Exhibit 1011	U.S. 5,516,497 to Speronello
Exhibit 1012	Ishihara et al., "Copper Ion-Exchanged SAPO-34 as a Thermostable Catalyst for Selective Reduction of NO with C ₃ H ₆ ," 169 Journal of Catalysis 93-102 (1997)
Exhibit 1013	U.S. 4,297,328 to Ritscher
Exhibit 1014	Chung, S.Y. et al., "Effect of Si/Al Ratio of Mordenite and ZSM-5 Type Zeolite Catalysts on Hydrothermal Stability for NO Reduction by Hydrocarbons," Studies in Surface Science and Catalysis, vol. 130, pp. 1511-1516 at 1513 (2000)
Exhibit 1015	Declaration of Dr. Frank-Walter Schutze
Exhibit 1016	U.S. 4,544,538 to Zones

Patent Owner's Exhibits	
Exhibit 2001	Declaration of Stanley Roth in the <i>Inter Partes</i> Reexamination of U.S. Patent No. 7,601,662
Exhibit 2002	Cavataio, G., et. al., "Enhanced Durability of a Cu/Zeolite Based SCR Catalyst." SAE Int. J. Fuels. Lubr., Vol. 1, Issue 1 (2008).
Exhibit 2003	Declaration of Ahmad Moini in the <i>Inter Partes</i> Reexamination of U.S. Patent No. 7,601,662
Exhibit 2004	Second Declaration of Pramod Ravindran in the <i>Inter Partes</i> Reexamination of U.S. Patent No. 7,601,662
Exhibit 2005	Third Party Comments After Patent Owner's Response After ACP in the <i>Inter Partes</i> Reexamination of U.S. Patent No. 7,601,662

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