	Page 1
UNITED STATES PATENT AND TRADEMARK OFFICE	
BEFORE THE PATENT TRIAL AND APPEAL BOARD	
UMICORE AG & CO. KG,	
Petitioner	
ν.	
BASF CORPORATION,	
Patent Owner	
Cases IPR2015-01121, -01125	
Patent 7,601,662	
Cases IPR2015-01123, -01124	
Patent 8,404,203	
CONFIDENTIAL	
DEPOSITION OF MICHAEL TSAPATSIS, Ph.D.	
Tuesday, April 12, 2016	
REPORTED BY: DANA S. ANDERSON-LINNELL Job no: 16070	

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CONFIDENTIAL

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1	CONFIDENTIAL DEPOSITION OF MICHAEL TSAPATSIS, Ph.D.,	1	
2	taken on Tuesday, April 12, 2016, commencing at	1 2	APPEARANCES (continued):
3	9:01 a.m., at the Hyatt Regency, 1300 Nicollet Mall,	3	On Behalf of BASF Corporation:
4	Minneapolis, Minnesota, before Dana S.	4	Anish R. Desai, Esquire
5	Anderson-Linnell, a Notary Public of and for the	5	WEIL, GOTSHAL & MANGES, LLP
6	State of Minnesota.	6	1300 Eye Street, NW, Suite 900
7		7	Washington, DC 20005
8		8	Phone: 202.682.7000
9		9	Email: anish.desai@weil.com
10		10	
11		11	ALSO PRESENT: Dr. Stefan Retzow, Umicore
12		12	Dr. Frank-Walter Schütze, Umicore
13		13	· · · · · · · · · · · · · · · · · · ·
14		14	
15		15	
16		16	
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21		21	
22		22	
23		23	
24		24	
25		25	
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1	APPEARANCES	1	INDEX
2		2	
3	On Behalf of the Umicore AG & Co. KG:	3	WITNESS: Michael Tsapatsis, Ph.D. PAGE
4	K. Patrick Herman, Esquire	4	EXAMINATION BY:
5	Elizabeth Gardner, Esquire	5	Mr. Herman 8
6	ORRICK, HERRINGTON & SUTCLIFFE, LLP	6	Mr. Desai 184
7	51 West 52nd Street	7	INSTRUCTIONS NOT TO ANSWED. (None)
8	New York, NY 10019-6142 Phone: 212.506.5000		INSTRUCTIONS NOT TO ANSWER: (None.)
9 10	Email: pherman@orrick.com	9 10	PRODUCTION REQUESTS: (None.)
11	egardner@orrick.com	11	TRODUCTION REQUESTS. (None.)
12	egarunei @omex.com	12	INDEX OF MARKED EXHIBITS:
13	(Appearances continued on next page)	13	NDEA OF WEINNED EATIDITS.
14^{13}	(Appendices continued on next page)	14	Exhibit 1018 - Graph labeled '662 Patent:
15		15	Examples 1, 1A, 2-9, 12, 13, 16, 17 99
16		16	r,,,,,,,,,
17		17	INDEX OF PREVIOUSLY MARKED EXHIBITS:
18		18	
19		19	Exhibit 1001 - IPR 2015/1121, U.S. Patent
20		20	7,601,662 52
21		21	
22		22	Exhibit 1001 - IPR 2015/1123, U.S. Patent
23		23	8,404,203 52
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1	INDEX OF PREVIOUSLY MARKED EXHIBITS	PAGE	1	MICHAEL TSAPATSIS, Ph.D.,
2	(continued):	11102	2	called as a witness, being first duly sworn, was
3			3	examined and testified as follows:
4	Exhibit 1002 - U.S. Patent 4,046,888 134		4	EXAMINATION
5	Exhibit 1002 0.5.1 ment 1,010,000 151		5	BY MR. HERMAN:
6	Exhibit 1003 - U.S. Patent 4,503,023 134		6	Q. Good morning, Doctor. Is it Dr. Tsapatsis?
7	Exiliar 1005 C.b. Futeric 1,505,025 151			A. Yes.
8	Exhibit 1004 - U.S. Patent 6,709,644 134		8	Q. Did I get that right?
9			9	A. Right.
10	Exhibit 1005 - U.S. Patent Application		10	Q. My name is Patrick Herman, and I am with the
11	2006/0039843 120		11	law firm of Orrick, Herrington and Sutcliffe.
12			12	And I'm here today on behalf of Umicore. And
13	Exhibit 1007 - Siting of the Cu+ ions in		13	with me are Elizabeth Gardner, also from Orrick,
14	dehydrated ion exchanged synthetic and natural		14	and Stefan Retzow and Frank Mr. Schütze, both
15	chabasites: a Cu+ photoluminescence study 134		15	from Umicore.
16			16	Have you ever been deposed before, Doctor?
17	Exhibit 1010 - U.S. Patent 4,961,917 136		17	A. No. This is the first time.
18			18	Q. So just before we begin, just a couple of
19	Exhibit 1015 - Declaration of Dr. Frank-Walter		19	things to keep in mind. The first is it would be
20	Schütze 160		20	great if whenever you're answering a question to
21			21	respond orally as opposed to shaking your head or
22	Exhibit 2004 - Second Declaration of Pramod		22	making some other nonverbal response.
23	Ravindran 37		23	Is that okay?
24			24	A. That is okay.
25			25	Q. And then the second is we should both try
		Page 7		Page 9
1	INDEX OF PREVIOUSLY MARKED EXHIBITS	PAGE	1	our best to wait until each other are finished,
2	(continued):		2	me asking my question before you respond. And
3			3	I'll do the same for you. I'll wait until you're
4	Exhibit 2011 - Second Declaration of Ahmad		4	done providing your answer before asking another
5	Moini, Ph.D. 34		5	question.
б			6	Is that fine?
7	Exhibit 2012 - Nature of active species in		7	A. That is fine.
8	copper-based catalysts and their chemistry of		8	Q. And the last is if you have any trouble
9	transformation of nitrogen oxides 166		9	understanding my question, if there's a part of
10			10	it that's unclear to you, please feel free to let
11	Exhibit 2018 - Declaration of Dr. Michael		11	me know, and I'll try to rephrase.
12	Tsapatsis 14		12	Is that okay?
13			13	A. That is okay.
14	Exhibit 2019 - HIGHLY CONFIDENTIAL -		14	Q. Okay. So, Doctor, did you meet with anyone
15	ATTORNEYS' EYES ONLY, Declaration of		15	today in preparation for your deposition?
16	Dr. Ahmad Moini 39		16	A. Today?
17			17	Q. Just in general, at any time.
18			18	A. I met with Anish.
19			19	Q. Is he the only one you met with in
20			20	preparation?
21			21	A. Yes.
22			22	Q. And when was that meeting?
23 24			23	A. That was yesterday.
24 25			24 25	Q. Approximately how long?A. Maybe two hours.
1			L ² J	

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,	Page 10		Page 12
1	Q. Okay. Did you review any documents that	1	with?
2	refreshed your recollection during the meeting?	2	A. Chemical engineering and material science.
3	A. Yes. I reviewed my declaration.	3	Q. And in 2003, what was your research focused
4	Q. Okay. Anything else?	4	on?
5	A. The associated documents that I cite in my	5	A. On zeolite synthesis for absorption,
6	declaration.	6	separation and catalysis.
7	Q. Okay. Did you talk with anyone who was not	7	Q. And when you say "catalysis," what do you
8	present besides Anish?	8	mean by that?
9	A. No, I didn't.	9	A. Accelerating reactions using zeolite
10	Q. Okay. Now, I would like to spend a little	10	catalysts, improving selectivity of reactions and
11	time talking about your background and the work	11	making the materials that will do this
12	that you've done. And I don't want to go through	12	accelerations and improvements of selectivity.
13	your entire work and academic history; so perhaps	13	Q. Are there any particular reactions you were
14	maybe the last 15 years or so.	14	focused on?
15	Is that okay?	15	A. We are focusing on hydrocarbon processing.
16	A. That is okay.	16	We have focus on processing of tail gases of the
17	Q. Let's start maybe in about 2002. What were	17	Claus tail-gas process. And also we have
18	you doing in 2002?	18	reactions on we're studying reactions related
19	A. 2002, I was a professor at University of	19	to biomass, conversion to valuable products,
20	Massachusetts at Amherst.	20	chemicals and fuels.
21	Q. Okay. And what department were you	21	Q. And that was in 2003?
22	associated with?	22	A. That was starting in 2003.
23	A. Chemical engineer.	23	Q. Okay. And how long did that particular
24	Q. And generally did you have any research that	24	research work continue?
25	you were focusing on at the time?	25	A. It continues until now.
	· · ·	1	
	Page 11		Page 13
1		1	
1	A. Yes. I was focusing on research on	1	Q. Okay. You say you've been researching those
2	A. Yes. I was focusing on research on zeolites.	2	Q. Okay. You say you've been researching those same topics, the synthesis absorption and
2 3	A. Yes. I was focusing on research on zeolites.Q. Anything in particular about zeolites?	2 3	Q. Okay. You say you've been researching those same topics, the synthesis absorption and catalysis with respect to zeolites. And with
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2 3 4 5 6 7 8	 A. Yes. I was focusing on research on zeolites. Q. Anything in particular about zeolites? A. My research in zeolites at the time was on zeolite membranes, zeolite absorbants and synthesis of zeolite catalysts. Q. And did you write papers about those particular topics in the 2002 time frame? 	2 3 4 5 6 7 8	Q. Okay. You say you've been researching those same topics, the synthesis absorption and catalysis with respect to zeolites. And with respect to catalysis, those areas of catalysis that you mentioned to me?A. Uh-huh. Yes.Q. And that work has been continuing since about 2003 until the present?
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	 A. Yes. I was focusing on research on zeolites. Q. Anything in particular about zeolites? A. My research in zeolites at the time was on zeolite membranes, zeolite absorbants and synthesis of zeolite catalysts. Q. And did you write papers about those particular topics in the 2002 time frame? A. Yes, I wrote papers. Q. And how long were you a professor at the University of Massachusetts? A. From 1994. Q. And when did you stop working there? A. 2003. Q. Okay. And did your area of research change at all from 2002 to 2003? A. No. My area of research did not change. Q. Okay. So still those same topics with respect to zeolites? A. Yes. Q. Okay. Then what did you do in 2003? 	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	 Q. Okay. You say you've been researching those same topics, the synthesis absorption and catalysis with respect to zeolites. And with respect to catalysis, those areas of catalysis that you mentioned to me? A. Uh-huh. Yes. Q. And that work has been continuing since about 2003 until the present? A. Yes. Q. Okay. Now, in that 2003 to the present time frame, are there any particular problems with zeolites that you were focusing on? A. We are focusing on improving the stability of zeolites under hydrothermal exposure to hydrothermal conditions. We are looking at how to improve mass transfer in zeolites by creating mesoporosity in the zeolites. We are looking at how to improve the stability of zeolites in catalytic applications. Q. And you mentioned that you were working to improve stability of zeolites in catalytic applications. Did you write papers about that? A. Yes.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	 A. Yes. I was focusing on research on zeolites. Q. Anything in particular about zeolites? A. My research in zeolites at the time was on zeolite membranes, zeolite absorbants and synthesis of zeolite catalysts. Q. And did you write papers about those particular topics in the 2002 time frame? A. Yes, I wrote papers. Q. And how long were you a professor at the University of Massachusetts? A. From 1994. Q. And when did you stop working there? A. 2003. Q. Okay. And did your area of research change at all from 2002 to 2003? A. No. My area of research did not change. Q. Okay. So still those same topics with respect to zeolites? A. Yes. Q. Okay. Then what did you do in 2003? A. I moved to the University of Minnesota. Q. Okay. And what was your position there? A. Professor. 	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	 Q. Okay. You say you've been researching those same topics, the synthesis absorption and catalysis with respect to zeolites. And with respect to catalysis, those areas of catalysis that you mentioned to me? A. Uh-huh. Yes. Q. And that work has been continuing since about 2003 until the present? A. Yes. Q. Okay. Now, in that 2003 to the present time frame, are there any particular problems with zeolites that you were focusing on? A. We are focusing on improving the stability of zeolites under hydrothermal exposure to hydrothermal conditions. We are looking at how to improve mass transfer in zeolites by creating mesoporosity in the zeolites. We are looking at how to improve the stability of zeolites in catalytic applications. Q. And you mentioned that you were working to improve stability of zeolites in catalytic applications. Did you write papers about that? A. Yes. Q. So if I look through the list of papers that
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	 A. Yes. I was focusing on research on zeolites. Q. Anything in particular about zeolites? A. My research in zeolites at the time was on zeolite membranes, zeolite absorbants and synthesis of zeolite catalysts. Q. And did you write papers about those particular topics in the 2002 time frame? A. Yes, I wrote papers. Q. And how long were you a professor at the University of Massachusetts? A. From 1994. Q. And when did you stop working there? A. 2003. Q. Okay. And did your area of research change at all from 2002 to 2003? A. No. My area of research did not change. Q. Okay. So still those same topics with respect to zeolites? A. Yes. Q. Okay. Then what did you do in 2003? A. I moved to the University of Minnesota. Q. Okay. And what was your position there? 	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	 Q. Okay. You say you've been researching those same topics, the synthesis absorption and catalysis with respect to zeolites. And with respect to catalysis, those areas of catalysis that you mentioned to me? A. Uh-huh. Yes. Q. And that work has been continuing since about 2003 until the present? A. Yes. Q. Okay. Now, in that 2003 to the present time frame, are there any particular problems with zeolites that you were focusing on? A. We are focusing on improving the stability of zeolites under hydrothermal exposure to hydrothermal conditions. We are looking at how to improve mass transfer in zeolites by creating mesoporosity in the zeolites. We are looking at how to improve the stability of zeolites in catalytic applications. Q. And you mentioned that you were working to improve stability of zeolites in catalytic applications. Did you write papers about that? A. Yes.

4 (Pages 10 to 13)

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	Page 14		Page 16
1	where that's specifically addressed?	1	Q. Is that one about hydrothermal stability?
2	A. Yes.	2	A. No.
3	Q. Why don't we take a brief look at your	3	Q. How about 155?
4	your CV is attached to your declaration, is that	4	A. No.
5	right?	5	Q. 154?
б	A. Yes.	6	A. No.
7	Q. And I'd like to show you what's been	7	Q. 153?
8	previously marked as Exhibit 2018 in all of the	8	A. No.
9	IPRs that are at issue. So that's IPR	9	Q. 152?
10	2015/01121, 1123, 1124 and 1125. And I believe	10	A. No.
11	your CV is attached to the back of the document	11	Q. 151?
12	that I just handed to you.	12	A. No.
13	A. (Reviews document.) Yes.	13	Q. 150?
14	Q. And if you will turn to that for me.	14	A. No.
15	Starting at about page 085. Do you see the	15	Q. So that's all the papers you've published in
16	numbers in the lower right corner?	16	2003, but none of those are about hydrothermal
17	A. Yes.	17	stability, is that true?
18	Q. There's a list of papers that you've	18	A. Yes, that's true.
19	published, is that right?	19	Q. And how about 150, is that about
20	A. Yes.	20 21	hydrothermal stability?
21 22	Q. And if you flip through, they're in date	22	A. No.
22	order. A. Yes.	22	Q. 149? A. No.
23 24	Q. You can find the papers that you started	24	Q. So can you find, looking at the papers of
24 25	publishing at about 2003 beginning on page 95.	25	2004, any paper in that collection in 2004 that's
2.5	Page 15		Page 17
1			
1	A. Yes.		about hydrothermal stability of zeolite
2	Q. And at the bottom there there's a paper	2	materials?
3	that's entitled Highly Crystalline Layered	3	A. In 2004, no.
4 5	Silicate with Three-Dimensionally Microporous	5	Q. How about in 2005?A. In 2005, no.
6	Layers? A. What page?	6	A. III 2003, IIO. Q. 2006?
7	Q. On page 95.	7	A. In 2006, no.
8	A. Yes.	8	Q. Okay. So we looked at 2003, 2004, 2005,
9	Q. So that's one of your papers, right?	9	2006. And in those time that time period, you
10	A. Yes.	10	didn't write any papers relating to the
11	Q. And that's about the crystalline structure	11	hydrothermal stability of zeolite materials,
12	and microporous layers of particular materials	12	right?
13	that you were working with?	13	MR. DESAI: Objection to form.
14	A. Yes.	14	THE WITNESS: Correct.
15	Q. And if you start reading up, at 157, item	15	BY MR. HERMAN:
16	number 157 is Roles of Transients and Nucleation	16	Q. Now, in that time period were you working in
17	in Film Deposition Within a Support?	17	industry?
18	A. Yes.	18	A. No. I was working at the University of
19	Q. That doesn't say anything about hydrothermal	19	Minnesota at the time.
20	aging in its title, is that right?	20	Q. So you were not working to design exhaust
21	A. Yes, it doesn't.	21	gas treatment systems, right?
22	Q. So 156, that's your next paper. That's	22	A. No, I was not.
23	Microstructural Optimization of the Zeolite	23	Q. And you were not working to select catalysts
24 25	Membrane for Organic Vapor Separation? A. Yes.	24 25	for reducing nitrogen oxides in diesel engine exhaust, true?

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