

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UMICORE AG & CO. KG,

Petitioner

v.

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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<p>1 CONFIDENTIAL DEPOSITION OF MICHAEL TSAPATSI, Ph.D.,</p> <p>2 taken on Tuesday, April 12, 2016, commencing at</p> <p>3 9:01 a.m., at the Hyatt Regency, 1300 Nicollet Mall,</p> <p>4 Minneapolis, Minnesota, before Dana S.</p> <p>5 Anderson-Linnell, a Notary Public of and for the</p> <p>6 State of Minnesota.</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p>1 APPEARANCES (continued):</p> <p>2</p> <p>3 On Behalf of BASF Corporation:</p> <p>4 Anish R. Desai, Esquire</p> <p>5 WEIL, GOTSHAL & MANGES, LLP</p> <p>6 1300 Eye Street, NW, Suite 900</p> <p>7 Washington, DC 20005</p> <p>8 Phone: 202.682.7000</p> <p>9 Email: anish.desai@weil.com</p> <p>10</p> <p>11 ALSO PRESENT: Dr. Stefan Retzow, Umicore</p> <p>12 Dr. Frank-Walter Schütze, Umicore</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

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<p>1 APPEARANCES</p> <p>2</p> <p>3 On Behalf of the Umicore AG & Co. KG:</p> <p>4 K. Patrick Herman, Esquire</p> <p>5 Elizabeth Gardner, Esquire</p> <p>6 ORRICK, HERRINGTON & SUTCLIFFE, LLP</p> <p>7 51 West 52nd Street</p> <p>8 New York, NY 10019-6142</p> <p>9 Phone: 212.506.5000</p> <p>10 Email: pherman@orrick.com</p> <p>11 egardner@orrick.com</p> <p>12</p> <p>13 (Appearances continued on next page)</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p>1 INDEX</p> <p>2</p> <p>3 WITNESS: Michael Tsapatsis, Ph.D. PAGE</p> <p>4 EXAMINATION BY:</p> <p>5 Mr. Herman 8</p> <p>6 Mr. Desai 184</p> <p>7</p> <p>8 INSTRUCTIONS NOT TO ANSWER: (None.)</p> <p>9</p> <p>10 PRODUCTION REQUESTS: (None.)</p> <p>11</p> <p>12 INDEX OF MARKED EXHIBITS:</p> <p>13</p> <p>14 Exhibit 1018 - Graph labeled '662 Patent:</p> <p>15 Examples 1, 1A, 2-9, 12, 13, 16, 17 99</p> <p>16</p> <p>17 INDEX OF PREVIOUSLY MARKED EXHIBITS:</p> <p>18</p> <p>19 Exhibit 1001 - IPR 2015/1121, U.S. Patent</p> <p>20 7,601,662 52</p> <p>21</p> <p>22 Exhibit 1001 - IPR 2015/1123, U.S. Patent</p> <p>23 8,404,203 52</p> <p>24</p> <p>25</p>

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1	INDEX OF PREVIOUSLY MARKED EXHIBITS	1	MICHAEL TSAPATSIS, Ph.D.,
2	(continued):	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		5	BY MR. HERMAN:
6	Exhibit 1003 - U.S. Patent 4,503,023 134	6	Q. Good morning, Doctor. Is it Dr. Tsapatsis?
7		7	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	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.
6		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		23	A. That was yesterday.
24		24	Q. Approximately how long?
25		25	A. Maybe two hours.

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1 Q. Okay. Did you review any documents that
 2 refreshed your recollection during the meeting?
 3 A. Yes. I reviewed my declaration.
 4 Q. Okay. Anything else?
 5 A. The associated documents that I cite in my
 6 declaration.
 7 Q. Okay. Did you talk with anyone who was not
 8 present besides Anish?
 9 A. No, I didn't.
 10 Q. Okay. Now, I would like to spend a little
 11 time talking about your background and the work
 12 that you've done. And I don't want to go through
 13 your entire work and academic history; so perhaps
 14 maybe the last 15 years or so.
 15 Is that okay?
 16 A. That is okay.
 17 Q. Let's start maybe in about 2002. What were
 18 you doing in 2002?
 19 A. 2002, I was a professor at University of
 20 Massachusetts at Amherst.
 21 Q. Okay. And what department were you
 22 associated with?
 23 A. Chemical engineer.
 24 Q. And generally did you have any research that
 25 you were focusing on at the time?

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1 A. Yes. I was focusing on research on
 2 zeolites.
 3 Q. Anything in particular about zeolites?
 4 A. My research in zeolites at the time was on
 5 zeolite membranes, zeolite adsorbants and
 6 synthesis of zeolite catalysts.
 7 Q. And did you write papers about those
 8 particular topics in the 2002 time frame?
 9 A. Yes, I wrote papers.
 10 Q. And how long were you a professor at the
 11 University of Massachusetts?
 12 A. From 1994.
 13 Q. And when did you stop working there?
 14 A. 2003.
 15 Q. Okay. And did your area of research change
 16 at all from 2002 to 2003?
 17 A. No. My area of research did not change.
 18 Q. Okay. So still those same topics with
 19 respect to zeolites?
 20 A. Yes.
 21 Q. Okay. Then what did you do in 2003?
 22 A. I moved to the University of Minnesota.
 23 Q. Okay. And what was your position there?
 24 A. Professor.
 25 Q. And what department were you associated

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1 with?
 2 A. Chemical engineering and material science.
 3 Q. And in 2003, what was your research focused
 4 on?
 5 A. On zeolite synthesis for absorption,
 6 separation and catalysis.
 7 Q. And when you say "catalysis," what do you
 8 mean by that?
 9 A. Accelerating reactions using zeolite
 10 catalysts, improving selectivity of reactions and
 11 making the materials that will do this
 12 accelerations and improvements of selectivity.
 13 Q. Are there any particular reactions you were
 14 focused on?
 15 A. We are focusing on hydrocarbon processing.
 16 We have focus on processing of tail gases of the
 17 Claus tail-gas process. And also we have
 18 reactions on -- we're studying reactions related
 19 to biomass, conversion to valuable products,
 20 chemicals and fuels.
 21 Q. And that was in 2003?
 22 A. That was starting in 2003.
 23 Q. Okay. And how long did that particular
 24 research work continue?
 25 A. It continues until now.

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1 Q. Okay. You say you've been researching those
 2 same topics, the synthesis absorption and
 3 catalysis with respect to zeolites. And with
 4 respect to catalysis, those areas of catalysis
 5 that you mentioned to me?
 6 A. Uh-huh. Yes.
 7 Q. And that work has been continuing since
 8 about 2003 until the present?
 9 A. Yes.
 10 Q. Okay. Now, in that 2003 to the present time
 11 frame, are there any particular problems with
 12 zeolites that you were focusing on?
 13 A. We are focusing on improving the stability
 14 of zeolites under hydrothermal -- exposure to
 15 hydrothermal conditions. We are looking at how
 16 to improve mass transfer in zeolites by creating
 17 mesoporosity in the zeolites. We are looking at
 18 how to improve the stability of zeolites in
 19 catalytic applications.
 20 Q. And you mentioned that you were working to
 21 improve stability of zeolites in catalytic
 22 applications. Did you write papers about that?
 23 A. Yes.
 24 Q. So if I look through the list of papers that
 25 are attached to your CV, am I going to see some

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

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