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	Filed:	Jun. 8, 2009
Issued:	Oct. 13, 2009	Issued:	Mar. 26, 2013
Inventors:	Ivor Bull, et al.	Inventors:	Ivor Bull, et al.
Title: Copper CHA Zeolite Catalysts		Title: Processes for Reducing Nitrogen Oxides Using Copper CHA Zeolite Catalysts	

DECLARATION OF DR. AHMAD MOINI IN IPR2015-01121, IPR2015-01123, IPR2015-01124, & IPR2015-01125

I, Dr. Ahmad Moini, make this declaration in connection with the above referenced *Inter Partes* Reviews of U.S. Patent Nos. 7,601,662 and 8,404,203.

I.   Introduction

1.   I am a Senior Expert and Research Fellow at BASF Corporation. I received a B.S. in Chemistry from Eastern Washington University in 1982 and a Ph.D. in Chemistry from Texas A&M University in 1986. I have been employed by BASF as a scientist for 9 years.

2.   I am a co-inventor of the patented subject matter that is described and claimed in both the 662 and 203 Patents.

3.   In the course of the previous *Inter Partes* Reexamination of the 662

Patent, I submitted two declarations in support of the patentability of the '662

patent. My first declaration was submitted to the United States Patent and

Trademark Office ("USPTO") on February 9, 2011. My second declaration was

submitted to the USPTO on December 18, 2011.

II.   BASF's CuCHA SCR Catalyst

4.   BASF Corporation sells a copper loaded aluminosilicate CHA

("CuCHA") zeolite catalyst for use in the selective catalytic reduction of nitrogen

oxides in the exhaust treatment system of diesel engines.   I am familiar with the

product specification for the commercially available CuCHA catalyst sold by

BASF. The product specification details the minimums, maximums, and targets

for the CHA content, SiO_2/Al_2O_3 molar ratio ("SAR") and the copper content,

expressed as weight percentage CuO. The final CuCHA catalyst product that is

sold by BASF to customers is made according to the product specification.

5.   The product specification for the CuCHA catalyst requires that the

final zeolite product, prior to Cu exchange, have a % crystallinity (from X-ray

diffraction), relative to a reference CHA material, between ████████████ This

tolerance shows that the zeolite is preferably a pure, highly crystalline CHA

zeolite, which is an aluminosilicate zeolite.

6.   The product specification for the CuCHA catalyst requires that the final product have a SAR between ████████ with a target SAR of ██

7.   The product specification for the CuCHA catalyst requires that the final product have a copper content, expressed as weight percentage CuO between ████████, with a target of ████

8.   The Cu/Al ratio of the product can be computed based on the SAR and copper weight percentage. For example, with a SAR of ██ and CuO weight percentage of ████ the Cu/Al ratio is ████ The calculation for this Cu/Al ratio is detailed below:

- Since the copper content has been expressed as CuO, this value is first converted to the corresponding amount of Cu. This is done by dividing ████ CuO by 79.55, thus obtaining moles CuO, and then multiplying by 63.55, thus obtaining ████ Cu.

- Assuming 100 grams of the filter cake, there would be ████ of copper and ████ of $Si_{31}Al_2O_{66}$. ████ of Cu divided by 63.55 g/mol for Cu results in ████ mol of Cu in the sample.

- Since $Si_{31}Al_2O_{66}$ has a molar mass of 1980.44, ████ of $Si_{31}Al_2O_{66}$ results in ████ mol $Si_{31}Al_2O_{66}$. Therefore, there would be ████ mol of Al in this sample.

- Dividing the ███ mol of Cu by 0.0984 mol of Al, gives the Cu/Al ratio ███

- It should be noted that the molar mass of the zeolite is an approximation, since there may be small amounts of H^+ and/or alkali ions that charge balance the aluminum sites not satisfied by the copper content. These residual amounts will not have a significant impact in the above calculations.

9.   A final product that meets the "target" specifications includes an aluminosilicate CHA zeolite that has a SAR of ██ and a Cu/Al ratio of ██.

10.   Utilizing the same chemical and mathematical formulas as detailed above, adjusted as appropriate for different SAR or copper weight percent, the following table shows the calculated Cu/Al contents of various embodying filter cakes that can be made according to the product specification.

SAR		CuO Weight %		Cu/Al Ratio
██ (target)		██ (minimum)		██
██ (target)		██ (maximum)		██
██ (maximum)		██ (maximum)		██
██ (minimum)		██ (maximum)		██
██ (target)		██ (target)		██

11.   The CuCHA catalyst is sold as a substrate that is coated with the CuCHA material. The type of substrate on which the CuCHA catalyst is coated includes both flow through substrates and wall flow filters. The CuCHA catalyst is

specifically made and intended for use in the selective catalytic reduction of nitrogen oxides in the presence of ammonia (*i.e.*, NH_3 SCR of NOx) in the exhaust treatment system of a diesel engine. The catalyst is disposed downstream of an injector that adds urea to the gas stream (and the urea is then converted to ammonia). The customers who purchase the CuCHA catalyst product do so because of the excellent properties of CuCHA material coated on the substrate.

III. Availability for Cross-Examination

12.   I realize that this signed declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also realize that I may be subject to cross examination in the case within the United States. If such cross examination is required, I will appear for cross examination within the United States during the time allotted.

IV.   Jurat

13.   I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

14.   I declare under penalty of perjury that the foregoing is true and correct.

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