

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

BASF CORPORATION,
Appellant

v.

**ANDREI IANCU, UNDER SECRETARY OF
COMMERCE FOR INTELLECTUAL PROPERTY
AND DIRECTOR OF THE UNITED STATES
PATENT AND TRADEMARK OFFICE,**
Intervenor

2017-1425, 2017-1426, 2017-1427, 2017-1428

Appeals from the United States Patent and Trade-
mark Office, Patent Trial and Appeal Board in Nos.
IPR2015-01121, IPR2015-01123, IPR2015-01124,
IPR2015-01125.

Decided: July 17, 2018

ANISH R. DESAI, Weil, Gotshal & Manges LLP, New
York, NY, argued for appellant. Also represented by
BRIAN E. FERGUSON, MEGAN WANTLAND, Washington, DC.

MEREDITH HOPE SCHOENFELD, Office of the Solicitor,
United States Patent and Trademark Office, Alexandria,

VA, argued for intervenor. Also represented by NATHAN K. KELLEY, KAKOLI CAPRIHAN, THOMAS W. KRAUSE, FARHEENA YASMEEN RASHEED.

Before REYNA, LINN, and CHEN, *Circuit Judges*.

CHEN, *Circuit Judge*.

SUMMARY

Appellant BASF Corporation appeals from four Patent Trial and Appcal Board final written decisions rendering unpatentable claims of its U.S. Patent Nos. 7,601,662 and 8,404,203 (the Patents). The Patents claim a special compound that can break down nitrogen oxide emissions in high temperature combustion processes.¹ IPR2015-01121 and IPR2015-01125 involved the '662 Patent; IPR2015-01123 and IPR2015-01124 involved the '203 Patent.

While this appeal was pending, the Supreme Court held in *SAS Institute, Inc. v. Iancu* that the Board is statutorily prohibited from instituting an inter partes review on a subset of the petitioned claims. 138 S. Ct. 1348, 1352–54 (2018). As with the inter partes review (IPR) in *SAS*, the two final written decisions on the '662 Patent resulted from partial institution decisions. BASF argues that this court lacks jurisdiction over these decisions because the appealed decisions are not final, and for that reason, asks this court to vacate the allegedly non-final Board decisions; the Patent and Trademark Office (the Director) disagrees. We recently held in *PGS Geophysical AS v. Iancu* that this court has jurisdiction under

¹ The two patents share the same specification and, for purposes of analysis in this appeal, claim the same subject matter.

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circumstances such as here. 891 F.3d 1354, 1359–63 (Fed. Cir. 2018). We thus reject BASF's jurisdictional argument.

As to the merits, we conclude that substantial evidence supports the factual findings underlying the Board's determination that all of the claims at issue are unpatentable as obvious over prior art U.S. Patent No. 6,709,644 (Zones) in view of U.S. Patent No. 4,046,888 (Maeshima). Thus, we *affirm*.

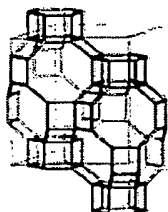
BACKGROUND

A. The Technology

The Patents claim a zeolite catalyst, a compound designed to break down nitrogen oxide (NO) emissions in automobile diesel engine exhaust. The breakdown process is called "selective catalytic reduction" or SCR.

The claimed zeolite is arranged into a special tetrahedral framework of alumina and silica molecules, called the CHA framework, depicted below.

CHA



Appx3186; Appellant's Br. at 9. Metals can be introduced into the zeolite by replacing some of the aluminum with metal cations, such as copper (Cu^{2+}). The claimed zeolite is such a copper-based catalyst. The amount of added copper is called the ion exchange ratio and can be quantified as the ratio of added copper to the aluminum in the zeolite (Cu/Al ratio).

The patented invention has several characteristics, the combination of which BASF claims allowed for greater

hydrothermal and thermal stability of the catalyst, making it commercially viable to catalyze reduction of NO emissions in combustion processes:

- A CHA framework;
- A high silicon to aluminum molar ratio (15 to 150);
- A high copper to aluminum atomic ratio (0.25 to 1); and
- An ability to selectively catalyze NO into nitrogen and water in the presence of ammonia (NH₃), a process referred to herein as ammonia SCR.

The last limitation (ammonia SCR) is the most relevant to BASF's appeal.

The following are the representative claims from the Patents identified by BASF.

1. A catalyst comprising: an aluminosilicate zeolite having the CHA crystal structure and a mole ratio of silica to alumina from about 15 to about 150 and an atomic ratio of copper to aluminum from about 0.25 to about 1, the catalyst effective to promote reaction of ammonia with nitrogen oxides to form nitrogen and H₂O selectively.

'662 Patent, Inter Partes Reexamination Certificate (C1), col. 1 l. 56–col. 2 l. 3.

14. [A process for the reduction of oxides of nitrogen contained in a gas stream in the presence of oxygen wherein said process comprises contacting the gas stream with a catalyst comprising a zeolite having the CHA crystal structure and a mole ratio of silica to alumina from about 15 to about 100 and an atomic ratio of copper to aluminum from about 0.25 to about 0.50],² wherein the pro-

² Dependent claim 14 depends from claim 1. The limitations of claim 1 are shown in the brackets.

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cess further comprises adding a reductant to the gas stream.

15. The process of claim 14, wherein the reductant comprises ammonia or an ammonia precursor.

'203 Patent col. 23 ll. 51-54.

B. Relevant Board Proceedings

In IPR2015-01121 and IPR2015-01123, Petitioner Umicore AG & Co. KG (which is no longer a party to this proceeding due to settlement) petitioned for, and the Board instituted, inter partes reviews of claims 1-8, 12-24, 30, and 32-50 of the '662 Patent and claims 1-31 of the '203 Patent under 38 U.S.C. § 103 for obviousness over the combination of Zones and Maeshima.³

Zones undisputedly discloses all elements of the patented invention, other than the specific copper-to-aluminum ratio required by the claims and whether the zeolite effectively catalyzes reduction via ammonia SCR. Zones discusses methods for making and using a particular synthetic zeolite with the CHA structure (SSZ-62). This CHA zeolite has a silica-to-alumina ratio ranging from 20-50, as encompassed by the Patents' claims. Zones, col. 1 ll. 32-35, col. 2 ll. 30-38. Zones' zeolite may

³ A third prior art reference, U.S. Patent Application Publication No. US 2006/0039843 A1 (Patchett), was used to address limitations relating to the emissions treatment system found in some of the instituted claims. BASF does not appeal any of the Board's findings regarding this reference. So, in this decision, we combine analysis of the claims rendered obvious by Maeshima, Zones, and Patchett with the analysis of the claims rendered obvious by Maeshima and Zones alone.

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