

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte YUSUF G. ADEWUYI and J. SCOTT BUCHANAN

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Appeal No. 95-2227  
Application No. 08/048,964<sup>1</sup>

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ON BRIEF

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Before WILLIAM F. SMITH, ROBINSON, and LORIN, Administrative Patent Judges.  
ROBINSON, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-20, which are all of the claims pending in the case. Independent claim 1 is illustrative of the subject matter on appeal is reproduced below:

1. A catalytic cracking process for converting a heavy hydrocarbon feed to lighter products comprising;

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<sup>1</sup> Application for patent, filed April 16, 1993. According to appellants, the application is a continuation of Application 07/877,935, filed May 4, 1992, now abandoned.

a. charging a heavy hydrocarbon feed comprising hydrocarbons boiling above 650°F to a riser catalytic cracking reactor;

b. charging a hot fluidized solids mixture, from a catalyst regenerator to the base of said riser reactor, said mixture comprising:

a physical mixture of regenerated base FCC cracking catalyst and separate particles of shape selective zeolite cracking catalyst additive, said mixture containing 87.5 to 65 wt % base FCC catalyst and 12.5 to 35 wt % additive, and wherein said additive comprises a catalytically effective amount of a zeolite having a silica:alumina ratio above 12 and a Constraint Index of 1 - 12 in an amorphous support,[sic. ,];

c. catalytically cracking said feed at catalytic cracking conditions including a riser outlet temperature of about 925 to 1050°F to produce catalytically cracked products including ethylene, propylene, and a C5 + gasoline fraction and a spent solids mixture comprising spent cracking catalyst and additive catalyst which are discharged from said outlet of said riser reactor;

d. separating in a vessel containing said riser outlet a cracked product rich vapor phase, which is withdrawn from said vessel, from a spent solids mixture rich phase containing spent cracking catalyst and shape selective additive catalyst;

e. stripping said spent solids mixture in a stripping means at stripping conditions to produce a stripped solids phase;

f. decoking said stripped solids phase in a catalyst regeneration means operating at catalyst regeneration conditions to produce said hot fluidized solids mixture, which is recycled to the base of said riser reactor, and

g. fractionating said cracked product rich vapor phase in a product fractionation means to produce:

i. at least 44.0 wt % C5+ gasoline,

ii. at least 15 LV % propylene, and

iii. no more than 2.0 wt % ethylene and wherein more propylene is produced than would be produced by cracking the same feed at the same conditions with the same amount of the shape selective zeolite present in the same particle as the said base FCC cracking catalyst.

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The references relied upon by the examiner are:

Rosinski et al. (Rosinski)	3,758,403	Sept. 11, 1973
Young	4,356,338	Oct. 26, 1982

### **GROUND OF REJECTION**

Claims 1-6, 10-12, and 18-19 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Rosinski.

Claims 7-9, 13-17, and 20 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Rosinski and Young.

We affirm-in-part.

### **BACKGROUND**

At page 8 of the specification, appellants describe the invention as relating to a catalytic cracking process for converting a heavy hydrocarbon feed to lighter products. The described cracking process includes the steps of charging a heavy hydrocarbon feed to a riser catalytic cracking reactor, while charging a hot fluidized solids catalyst mixture, from a catalyst regenerator, to the base of the riser reactor. The catalyst mixture is said to contain a physical mixture of regenerated base FCC cracking catalyst and separate particles of shape selective zeolite cracking catalyst additive. The additive is described as containing a catalytically effect amount of a zeolite having a silica:alumina ratio about 12 and a Constraint Index of 1-12 in an amorphous support. This zeolite catalyst is exemplified by ZSM-5. The process is said to produce cracked products including ethylene, propylene, and a C5 + gasoline fraction.

## **DISCUSSION**

### The rejections under 35 U.S.C. § 103

Claims 1-6, 10-12, and 18-19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Rosinski.

Claims 7-9, 13-17, and 20 rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Rosinski and Young.

We have chosen to group the two grounds of rejections, since appellants have not chosen to separately argue the rejection over the combination of Rosinski and Young. (Brief, page 4).

#### **Claims 1-17:**

We begin our analysis of this appeal by noting that the appellants have conceded the prima facie case of obviousness as to "Claim 1-10-16" at page 5 of the Brief. We interpret this claim designation as being directed to independent claims 1, 10 and 16 and to include all claims dependent thereon. Appellants state that there are two issues presented for our consideration and thus determinative of the rejections of the appealed claims. The two issues are stated to be (Brief, page 5):

1. The adequacy of the showing of unexpected results.
2. Claim scope, are claims commensurate with the showing?

At page 5 of the Examiner's Answer (Answer), the examiner concedes that "... the claim scope is commensurate with the showing."

Therefore, we are left with only the single issue as to whether the showing of unexpected results is sufficient to overcome the rejections of the claims under 35 U.S.C. § 103.

Having conceded the prima facie case of obviousness over Rosinski alone or in combination with Young, appellants have accepted that it would be within the purview of the skilled artisan to optimize all parameters disclosed in the reference. In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) and cases cited therein. There appears to be no dispute that one practicing claim 1 would be operating within the 4-corners of Rosinski. We note that Rosinski additionally explains the goal of optimizing the amounts of C3 and C4 olefins (Rosinski, col. 1, lines 19-21) which is also emphasized by appellants (Specification, page 31, lines 36-39).

It is well settled that a prima facie case of obviousness may be rebutted "where the results of optimizing a variable, which was known to be result effective, [are] unexpectedly good." In re Boesch, supra; In re Antonie, 559 F.2d 618, 620, 195 USPQ 6, 8-9 (CCPA 1977).

Appellants appear to rely on the graphic presentation of data which is attached to the declaration of Dr. Adewuyi filed March 19, 1993. The graph is said to compare the propylene production using the claimed process with the propylene production resulting from the processes disclosed by the examples of Rosinski. The only evidence specifically relied upon is from the graph. We note that there are 4 declarations, as well as the specification, relating to the comparison of the claimed process with the process

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disclosed by Rosinski. The appellants' brief is less than clear as to just what part of the data they are specifically relying on. (See 37 CFR § 1.192(a)). However, there seems to be no question that the evidence submitted by appellants and presented in the specification seeks to compare the claimed invention with the examples provided by Rosinski. We acknowledge that proof of unexpected properties may be in the form of direct or indirect comparative testing of the claimed invention and the closest prior art. In re Boesch, supra.

The examiner has questioned the persuasiveness of this type of comparison stating (Answer, page 5 ):

The argument that unexpected experimental results rebut the prima facie case of obviousness is not persuasive because the results are not compared to the closest prior art. .... a comparison is made with the Rosinski case in which the ZSM-5 and large pore aluminosilicates are contained in the same particle, no comparison is made with Rosinski case in which a mixture of particles is added to the cracking unit, some particles containing only the ZSM-5 aluminosilicate and the other particles containing only the large-pore aluminosilicate.

Appellants' take the position (Brief, page 5) that:

While it is true that Rosinski teaches separate particle additives, he also teaches that they are not preferred.

Appellants urge that the closest prior art is represented by the Rosinski's examples with both the cracking catalyst and ZSM-5 present in a single particle or matrix (Brief, page 6).

Thus appellants' seek to compare the claimed process with that of Rosinski, albeit, where the Rosinski catalyst components are present in a single matrix.

We have reviewed both the evidence and appellants' arguments. We find no error in the examiner's determination that appellants have failed to compare the closest prior art. In a section 103 inquiry, "the fact that a specific embodiment is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered. The reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art. Merck & Co. v. Biocraft Lab., Inc., 874 F.2d 804, 808, 10 USPQ2d 1843, 1846 (Fed. Cir), cert. denied, 493 U.S. 975 (1989); In re Lamberti, 545 F2d 747, 750, 192 USPQ 278, 280 (CCPA 1976). Rosinski discloses, albeit not as the preferred embodiment, the use of separate catalytic particles as herein claimed. At Column 7, lines 34-44, Rosinski states that while one embodiment of the disclosed process would make use of the two catalysts in a matrix, the process specifically exemplified in the examples, that the other embodiment would be a physical mixture of catalyst particles where each particle contains only one of the two types of zeolite catalysts. The reference fairly suggests to those skilled in this art that the two catalysts could be used in a physical mixture of particles, where the individual catalyst components are present on separate particles. This represents the closest prior art to appellants' claimed process as argued by the examiner. Thus, it is our conclusion that the showing is not sufficient to overcome the prima facie case of unpatentability established by the examiner. The rejection of claims 1-17 are affirmed.

While not necessary for our determination in this appeal and therefore not reached in our consideration of the issue presented, we find it less than clear why the examiner deemed the data of record commensurate in scope with the claimed subject matter. We note that the

appellants acknowledge at paragraphs 10-18 of the Adewuyi declaration of June 4, 1993, the specific parameters relating to temperature, pressure, residence time, and feed stock used in comparing the process of Rosinski and the claimed process. All would appear to be process parameters, which would affect the final product, and yet are not reflected in the limitations in claim 1, 10 and 16. Should further prosecution occur, the examiner should carefully review the evidence of record or subsequently submitted evidence to determine if the evidence is in fact commensurate with the claimed subject matter.

**Claims 18-20:**

Appellants have separately argued the patentability of claims 18, 19, and 20. The examiner has not separately addressed these claims in the statement of rejection. However, in rebuttal to appellants' arguments in the Brief, he states (Answer, page 6):

Therefore, it is the examiner's position that one of ordinary skill in the art would monitor the product composition including the amounts of methane, butadiene, normal olefins, and cyclic olefins and vary the amount of additive to optimize the product composition. It is the examiner's position that the claimed process is an optimization of the process parameters disclosed by Rosinski et al. with this optimization being within the level of ordinary skill in the art.

The examiner offers no other support for the proposition that the claims are obvious over Rosinski alone or in combination with Young. We find nothing in either reference which would suggest that one skilled in this art should monitor either the "C7 to C10 normal to C7 to C10 cyclic olefin ratio" or "the methane and butadiene" produced by a cracking process with a view to controlling the amount of ZSM-5 present in the claimed process.

The examiner bears the initial burden of presenting a prima facie case of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444

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(Fed. Cir. 1992). On these circumstances, we are constrained to reach the conclusion that the examiner has failed to establish that it would have been obvious to those of ordinary skill in the art at the time of the invention to periodically measure the C7 to C10 n-olefin and C7 to C10 cyclic olefin content (Clm.18) or to periodically measure at least one of the butadiene and methane yields (Clm. 19), in a catalytic cracking process, with the purpose of controlling the amount of zeolite catalyst present in the reaction mixture. The examiner's rejections of the claims are fatally defective since they do not properly account for and establish the obviousness of the subject matter as a whole. Where the examiner fails to establish a prima facie case, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir.1988).

The rejections of claims 18-20 is reversed.

#### **SUMMARY:**

The rejections of claims 1-17 as being unpatentable under 35 U.S.C. § 103 are affirmed. The rejections of claims 18-20 as being unpatentable under 35 U.S.C. § 103 are reversed.

We affirm-in-part.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

WILLIAM F. SMITH	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
DOUGLAS W. ROBINSON	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
	)	
HUBERT C. LORIN	)	
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