

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EMANUEL HERMANUS VAN BROEKHOVEN
and
PIETER BOGAARD

Appeal 2006-2675
Application 10/278,143
Technology Center 1700

Decided: September 28, 2006

Before WARREN, TIMM, and FRANKLIN, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal the rejection of claims 1-6, the only claims pending in this application. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

INTRODUCTION

The claims are directed to an alkylation process using a particular catalyst including at least about 0.05 wt% sulfur. Claim 1 is illustrative:

1. A process for alkylating a hydrocarbon feed which comprises contacting the hydrocarbon feed to be alkylated with an alkylation agent in the presence of a catalyst comprising a solid acid, 0.01 wt% to 1 wt% of a hydrogenation component consisting essentially of one or more Group VIII noble metals, and at least about 0.05 wt% of sulfur, based on the total weight of the catalyst composition and calculated as S.

The Examiner relies upon the following reference in the rejection of claims on appeal:

Van Brugge EP 0,640,575 B1 May 14, 1997

Appellants rely upon the following reference in rebuttal:

J. Biswas, *The Role of Deposited Poisons and Crystallite Surface Structure in the Activity and Selectivity of Reforming Catalysts*, 30(2) Catal. Rev. – Sci. Eng. 161-247 (1988)

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Van Brugge.

We affirm.

OPINION

The Examiner has established a prima facie case of obviousness based on the disclosure of Van Brugge. As found by the Examiner, Van Brugge describes alkylating a hydrocarbon feed (paraffins such as isobutane) by contacting the paraffins with an alkylation agent (olefin such as 2-butene) in the presence of a solid acid catalyst (Answer 3; Van Brugge 2:49-50 and Example 2). Van Brugge describes ion exchanging the zeolite of the catalyst with a Group VIII noble metal in amounts within the claimed range

(Van Brugge 5:42-44). Van Brugge further suggests that it is, in some instances, desired to add a trace amount of sulfur to the catalyst to moderate the activity of hydrogenating metal, i.e., the Group VIII noble metal (Van Brugge 3:36-39). Therefore, one of ordinary skill in the art would have added amounts of sulfur necessary to achieve the stated moderation. Such values, *prima facie*, would include concentrations within the claimed range of at least about 0.05 wt%.

Appellants rely upon Biswas as showing that the “trace amount” of Van Brugge is an amount lower than that required by claim 1. Specifically, according to Appellants, Biswas, near the bottom of page 212, teaches that at low S coverage ($\theta < 0.2$), the strong chemical bond of sulfur modifies the chemical properties of the Pt surface, but at higher values desired reactions are prevented to the point of the catalyst becoming chemically inert (Br. 5). Based on this disclosure in Biswas, Appellants conclude that the “trace amount” of Van Brugge is clearly quantified by Biswas as being 0.2 S atoms per Pt atom or less (Br. 5). Appellants further allege that the smallest amount of S atoms per Pt atom permitted by the claim is 0.34 S atoms per Pt atom (Br. 5). The implication according to Appellants’ argument is that because 0.34 S atoms per Pt atom is more than the 0.2 S atoms per Pt atom disclosed in Biswas, the amounts suggested by “trace amount” as used in Van Brugge are less than the claimed range.

We do not find Appellants’ evidence and argument persuasive. Van Brugge is directed to an alkylation process in which paraffins such as isobutene are reacted with olefins such as 2-butene. Van Brugge is concerned with moderating the activity of a Group VIII noble metal within a beta zeolite catalyst. Biswas is directed to reforming catalysts. We

recognize that there are, as noted by Appellants, some similarities in the reaction mechanisms of the two types of catalysts (Reply Br. 2), but this does not convince us that the effective amounts of sulfur in the environment of the reforming catalyst of Biswas are equivalent to the amounts to be in the Van Brugge process. We particularly note that the catalysts discussed in Biswas are alumina supported platinum catalysts whereas Van Brugge uses beta zeolite, not alumina, and can use palladium as well as platinum. Moreover, Appellants' claim 1 is not limited to platinum. We also note that Biswas indicates that other process parameters have an effect on the sulfur tolerance of the catalyst. For instance, there is greater sulfur tolerance at high pressures and low weight hourly space velocities (Biswas 213 ¶ 4). As a further matter, Biswas discloses that when $\theta = 0.25$, molecules can absorb on the surface, but are prevented by sulfur structure from participating in Langmuir-Hinshelwood reactions. It is only at $\theta = 0.5$, a level above Appellants' 0.34 S atoms per Pt atom level, that the Pt becomes inert. Appellants have not explained why only the $\theta < 0.2$ disclosure is relevant. Appellants also do not explain or show the calculations used to determine that a catalyst with 1 wt% Pt and 0.05 wt% S will have 0.34 S atoms per Pt atom. As a further matter, Appellants' analysis overlooks the fact that the claimed range includes the word "about" and, therefore, encompasses at least some values below 0.05 wt% sulfur.

The evidence is insufficient to show that the "trace amount" disclosed by Van Brugge excludes concentrations of sulfur at least about 0.05 wt%, levels that, *prima facie*, are sufficiently low to be considered "trace amounts" in the absence of convincing evidence to the contrary.

Appeal 2006-2675
Application 10/278,143

We conclude that the Examiner has established a prima facie case of obviousness that has not been sufficiently rebutted by Appellants.

CONCLUSION

In summary, the Examiner having established an unrebutted prima facie case of obviousness with respect to the subject matter of claims 1-6, we affirm the decision of the Examiner.

AFFIRMED

clj

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