

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte

KENRICK M. LEWIS, REGINA NELSON ENG
SABRINA R. CROMER, ABELLARD T. MERLEIGH,
and CHI-LIN O'YOUNG

Appeal 2007-1639
Application 09/974,092
Technology Center 1600

Decided: October 15, 2007

Before TONI R. SCHEINER, DEMETRA J. MILLS, and LORA M. GREEN,
Administrative Patent Judges.

SCHEINER, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-5 and 27.¹ The Examiner has rejected the claims as unpatentable over the prior art. We have jurisdiction under 35 U.S.C. § 6(b).

¹ Claims 9-26 are also pending, but have been withdrawn from consideration. Claims 6-8 have been canceled.

DISCUSSION

“The present invention relates to the production of trialkoxysilanes by the Direct Synthesis of silicon with alcohols in the presence of a [nanosized] copper catalyst” (Spec. 1: 10-12, and 6: 16-18). “This Direct Synthesis exhibits short induction times, high selectivity for trialkoxysilanes, high overall silicon conversion, and high, stable reaction rates” (*id.* at 1: 12-14).

Claim 1, the only independent claim, is representative:

1. A process for using a nanosized copper catalyst precursor selected from the group consisting of nanosized copper, nanosized copper oxides, nanosized copper chlorides, other nanosized copper salts, and mixtures thereof as sources of catalytic copper in the direct synthesis of trialkoxysilane of formula HSi(OR)_3 wherein R is an alkyl group containing from 1 to 6 carbon atoms inclusive, said process comprising:
 - (a) forming a reaction mixture comprising a thermally stable solvent, silicon metal, a catalytically effective amount of said nanosized copper catalyst precursor having an average particle size in a range from about 30 to about 60 nanometers;
 - (b) agitating and heating this mixture to form copper-activated silicon *in situ* and injecting into said reaction mixture an alcohol to react with said copper-activated silicon to produce said trialkoxysilane; and
 - (c) recovering said trialkoxysilane from the reaction product.

The Examiner relies on the following reference as evidence of obviousness:

Mendicino

US 5,783,720

Jul. 21, 1998

Claims 1-5 and 27 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Mendicino.

Mendicino describes a process for direct synthesis of trialkoxysilane using a copper catalyst precursor, which Appellants agree is “similar” to the claimed process (Appeal Br. 6), except for the requirement for a “copper catalyst precursor having an average particle size in a range from about 30 to about 60 nanometers” (Claim 1). According to the Examiner, “[t]he size of the copper particles is similar to those claimed” (Answer 5), and “it would have been *prima facie* obvious to use less than 100 nm particles because . . . using 60 nm particles was well within the skilled artisan [sic]” (*id.* at 6).

The Examiner’s conclusory statement is insufficient to establish obviousness. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”); *accord KSR International Co., v. Teleflex Inc.*, 127 S.Ct. 1727 (2007) (noting in order to facilitate review of the obviousness determination, the “analysis should be made explicit.”).

The particle size of the copper catalyst precursor used in Mendicino’s process “can be from less than 1 micron [1000 nanometers] up to about 100 microns [100,000 nanometers]” (Mendicino, col. 6, ll. 43-45), but no particle size smaller than 100 nanometers is discussed, and Mendicino teaches that “the preferred range [is] 0.1-30 microns [100-30,000 nanometers]” (*id.* at col. 6, ll. 45-46). In addition, the size range for the copper catalyst precursor used in Example 1 of Mendicino is given at 100-20,000 nanometers (*id.* at

col. 18, l. 46). Thus, Mendicino's smallest particle size (100 nanometers) is approximately 67% larger than the largest particle size (60 nanometers) permitted by the present claims. We agree with Appellants that this fact, coupled with Mendicino's preference for particle sizes ranging up to 20,000 or 30,000 microns, fails to suggest a particle size below 100 nanometers, much less the specifically recited range of 30-60 nanometers required by the present claims (Appeal Br. 7). *See In re Sebeck*, 465 F.2d 904, 907 (CCPA 1972) (obviousness rejection based on optimization reversed where claimed values were outside the prior art range).

On this record, the rejection of claims 1-5 and 27 under 35 U.S.C. § 103(a) as unpatentable over Mendicino is not sustainable. The rejection is reversed.

REVERSED

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