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ULMER & BERNE, LLP ATTN: DIANE BELL 600 VINE STREET SUITE 2800 CINCINNATI, OH 45202-2409			TORNOW, MARK W	
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* BERNARD MILES MALOFSKY,  
ADAM GREGG MALOFSKY, and  
MATTHEW MCBRAYER ELLISON

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Appeal 2018-009158  
Application 14/648,629  
Technology Center 2800

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Before MICHELLE N. ANKENBRAND, *Acting Vice Chief Administrative Patent Judge*, DONNA M. PRAISS, and JEFFREY R. SNAY, *Administrative Patent Judges*.

SNAY, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

STATEMENT OF THE CASE

Appellant<sup>2</sup> filed an appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 21–29.<sup>3</sup> We have jurisdiction under

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<sup>1</sup> Our Decision refers to the Specification filed May 29, 2015 (“Spec.”); the Final Office Action dated February 17, 2017 (“Final Act.”); Appellant’s Appeal Brief filed February 19, 2018 (“Br.”), and the Examiner’s Answer dated May 18, 2018 (“Ans.”).

<sup>2</sup> Appellant is the Applicant, Sirrus, Inc., which, according to the Appeal Brief, is the real party in interest. Br. 1.

<sup>3</sup> Claims 30–40 have been withdrawn from consideration. Final Act. 1.

35 U.S.C. § 6(b).

We REVERSE.

The subject matter on appeal relates to electronic assemblies and underfill for chip packages (*see, e.g.*, claim 21; Spec. ¶ 3). The Specification discloses that interconnects are conductive structures attached to metalized pads on the surface of a silicon chip to access electronic devices within the chip. *Id.* ¶¶ 4, 5. The Specification describes introducing an underfill composition into a gap between the chip and external circuitry once the interconnects are formed. *Id.* ¶ 5. The Specification discloses that conventional underfill materials are generally polymer composites or epoxy resins that can include inorganic particles to modify the underfill's coefficient of thermal expansion to more closely match that of the interconnects. *Id.* ¶ 6. According to the Specification, next generation electronic applications require improved materials and chip constructions, necessitating improved underfill materials. *Id.* ¶ 7.

Independent claim 21 is illustrative and is reproduced below from the Claims Appendix of the Appeal Brief.

21. An electronic assembly comprising:
  - an electronic component comprising a plurality of electrical interconnects;
  - a substrate comprising a plurality of electrical bonding pads; and
  - a first composition disposed between the electronic component and the substrate, the first composition comprising:
    - an oligomer or polymer formed from one or more of a methylene malonate monomer, a methylene beta ketoester monomer, a methylene beta diketone monomer, a di-alkyl di-substituted vinyl monomer, and a di-

haloalkyl di-substituted vinyl monomer; and  
a filler material; and  
wherein each of the plurality of electrical interconnects  
are respectively electrically bonded to one of the plurality of  
electrical bonding pads.

#### REJECTIONS ON APPEAL

- I. Claims 21–27 under 35 U.S.C. § 103(a) as being unpatentable over Ogata<sup>4</sup> in view of Narang;<sup>5</sup> and
- II. Claims 28 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Ogata and Narang and further in view of Yoshimura.<sup>6</sup>

#### DISCUSSION

##### *Rejection I*

Claims 21–27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogata in view of Narang.

The Examiner finds Ogata discloses an electronic assembly including, among other things, an electronic component, a substrate, and a first composition (i.e., Ogata’s adhesive sheet) disposed between the electronic component and the substrate. Final Act. 3. The Examiner finds Ogata’s adhesive sheet does not meet the composition recited in claim 21, but finds Narang discloses dialkyl methylene malonates as adhesive materials. *Id.* at 3–4. The Examiner determines it would have been obvious to use Narang’s disclosed material for Ogata’s adhesive because Narang discloses the

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<sup>4</sup> Ogata, US 2005/0106781 A1, published May 19, 2005 (“Ogata”).

<sup>5</sup> Narang et al., US 6,183,593 B1, issued Feb. 6, 2001 (“Narang”).

<sup>6</sup> Yoshimura et al., US 2007/0222051 A1, published Sept. 27, 2007 (“Yoshimura”).

material has increased flexibility, elasticity, and stability. *Id.* at 4. The Examiner also characterizes such use as selection of a known material based on its suitability for its intended use. *Id.*

Appellant contends the Examiner has failed to explain why one of ordinary skill in the art would have combined the semiconductor device of Ogata with the adhesive composition of Narang. Br. 7–9. Specifically, Appellant argues one of ordinary skill in the art would not have looked to Narang when seeking to improve Ogata’s device because Ogata’s adhesives necessarily are thermosetting, photocuring, or electron-beam curing adhesives (i.e., cure via the application of external energy), whereas Narang’s adhesive polymerizes, such as via a chemical curing initiator. *Id.* Appellant further asserts that Narang provides no reason to use its adhesive in an electronic assembly, and the Examiner has not properly considered whether there would have been a reasonable expectation of success. *Id.* at 9–11.

The Examiner responds that Narang discloses its adhesive can be used for numerous applications and for bonding various types of materials, and explains that the specific benefits Narang teaches for its adhesive “apply to the semiconductor bonding arts” because “flexible/elastic adhesives withstand cracking and stable compounds maintain their known benefits.” Ans. 2–5.

Appellant’s arguments are persuasive. “[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.” *KSR Int’l. Co. v. Teleflex Inc.*,

550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The Examiner's reasoning does not sufficiently articulate why one of ordinary skill in the art would have used Narang's material for Ogata's adhesive. The Examiner does not identify any evidence supporting the contention that one of ordinary skill in the art would have recognized flexibility as desirable in Ogata's adhesive layer. The stability Narang teaches relates to stability of its polymerizable monomer / polydimethylsiloxane mixture prior to polymerization (a mechanism Ogata's adhesives do not use), not the stability of the polymerized adhesive during its use. Narang 3:17–19, 3:26–30, and 5:53–66. Moreover, Appellant's arguments present persuasive technical reasoning that there are fundamental differences between Ogata's adhesive and Narang's material. For example, Ogata provides a thermosetting adhesive for the purpose of removing voids by softening the adhesive material prior under pressure prior to heat curing. *See* Ogata ¶¶ 63–64. Narang's disclosed materials are polymerized through use of initiators. Narang 6:63–66. The Examiner does not point to evidence of record to show that one skilled in the art would have had a reasonable expectation that Narang's material would have been suited for or capable of use in Ogata's void removal process.

Although Narang discloses a broad range of applications for its adhesive (i.e., both industrial and medical applications) and the bonding of various types of materials (Narang 1:10–21), the Examiner does not sufficiently explain how these teachings suggest the use of Narang's adhesive in the field of semiconductor devices, or in the particular application taught by Ogata.

For the foregoing reasons, Appellant's arguments are persuasive of reversible error in the Examiner's § 103(a) rejection of claim 21 over Ogata and Narang. Claims 22–27 depend from claim 21.

Accordingly, we do not sustain the Examiner's § 103(a) rejection of claims 21–27 over Ogata and Narang.

*Rejection II*

Claims 28 and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogata and Narang and further in view of Yoshimura.

The Examiner does not rely on Yoshimura to remedy the deficiencies discussed above with regard to the combination of Ogata and Narang. Therefore, we do not sustain the Examiner's § 103(a) rejection of claims 28 and 29.

DECISION

On the record before us and for the reasons given in Appellant's Appeal Brief and above, we *reverse* the Examiner's rejections.

REVERSED