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The Dow Chemical Company/Brooks Cameron & Huebsch
1201 MARQUETTE AVENUE SOUTH, SUITE 400
Minneapolis, MN 55403
UNITED STATES OF AMERICA

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WEYDEMEYER, ETHAN

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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* DONGKYU KIM,  
CHAN HAN, ROBERT C. CIESLINSKI,  
GIUSEPPE VAIRO, and LUIGI BERTUCELLI

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Appeal 2017-011422  
Application 14/384,813<sup>1</sup>  
Technology Center 1700

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Before ADRIENE LEPIANE HANLON, N. WHITNEY WILSON, and  
JANE E. INGLESE, *Administrative Patent Judges*.

HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

The Appellants filed an appeal under 35 U.S.C. § 134(a) from an Examiner's decision finally rejecting claims 1, 3, 4, 6, and 15–29. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> The real party in interest, and the Applicant, is said to be DOW GLOBAL TECHNOLOGIES LLC. Appeal Brief dated April 6, 2017 (“App. Br.”), at 3.

Representative claim 1 is reproduced below from the Claims Appendix to the Appeal Brief. The limitation at issue is italicized.

1. A fire resistant composite structure comprising:
  - a foam material;
  - a geopolymer thermal protection layer adhered to the foam material, wherein the geopolymer thermal protection layer is formed by curing geopolymer precursors *having a silicon to aluminum molar ratio in a range of 1.0:2.65 to 1.0:3.3*; and
  - a facing adhered to the geopolymer layer.

App. Br. 11.

The Examiner maintains the following rejections on appeal:

- (1) claims 1, 3, 4, and 6 under 35 U.S.C. § 103(a) as unpatentable over Blackstock et al.;<sup>2</sup>
- (2) claims 15–22 under 35 U.S.C. § 103(a) as unpatentable over Vahlbrauk<sup>3</sup> in view of Blackstock;
- (3) claims 23 and 24 under 35 U.S.C. § 103(a) as unpatentable over Vahlbrauk in view of Blackstock, and further in view of Munzenberger;<sup>4</sup>
- (4) claim 25 under 35 U.S.C. § 103(a) as unpatentable over Vahlbrauk in view of Blackstock, and further in view of Buckingham et al.;<sup>5</sup>
- (5) claim 26 under 35 U.S.C. § 103(a) as unpatentable over Vahlbrauk in view of Blackstock, and further in view of Ohnuma et al.;<sup>6</sup> and
- (6) claims 27–29 under 35 U.S.C. § 103(a) as unpatentable over Vahlbrauk in view of Blackstock, and further in view of Comrie.<sup>7</sup>

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<sup>2</sup> GB 2471765 A, published January 12, 2011 (“Blackstock”).

<sup>3</sup> DE 4108644 (A1), published September 17, 1992 (“Vahlbrauk”).

<sup>4</sup> US 2002/0068775 A1, published June 6, 2002 (“Munzenberger”).

<sup>5</sup> US 6,992,027 B1, issued January 31, 2006 (“Buckingham”).

<sup>6</sup> US 2004/0054022 A1, published March 18, 2004 (“Ohnuma”).

<sup>7</sup> US 2004/0255823 A1, published December 23, 2004 (“Comrie”).

B. DISCUSSION

The Examiner finds that Blackstock discloses a fire resistant composite structure comprising, *inter alia*, a geopolymer thermal protection layer, wherein the silicon to aluminum atomic ratio (mole ratio) in the layer is less than or equal to 1.3:1, which overlaps or encompasses the claimed range. Final 2–3 (citing Blackstock 11, ll. 17–23).<sup>8</sup>

The Appellants argue:

[A]ssuming for the sake of argument that Appellants' molar ratio is an analogous term to Blackstock[']s atomic ratio,<sup>[9]</sup> when normalized to 1.0 [Al] to ease comparison to the format [in] Blackstock[,], Applicant[']s values correspond to ratios of approximately 0.377[Si]:1.0[Al] and 0.303[Si]:1.0[Al] that notably are not overlapped by Blackstock's atomic ratio of 1.3[Si]:1.0[Al]. Further, such values are not even overlapped by Blackstock's claim 2's 'ideal' Si:Al atomic ratio between 0.5:1 and 1.3:1. In short, Blackstock's ratios do not overlap nor suggest Appellant's claimed ratios.

App. Br. 7 (emphasis omitted).

The Appellants' argument is not persuasive of reversible error. Blackstock discloses:

The present invention utilises a weathered basaltic type rock with a relatively high alumina content to form an alkaline aluminosilicate geopolymer cement material. Throughout this specification, by "relatively high alumina content", we mean having a Si:Al atomic ratio of *less than or equal to 1.3:1*.

Blackstock 11, ll. 20–23 (emphasis added).

We recognize that Blackstock discloses that "[i]deally, the geopolymer cement is formed from a precursor having a Si: Al atomic ratio in the range of

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<sup>8</sup> Final Office Action dated October 4, 2016.

<sup>9</sup> According to Blackstock, "in the geopolymer art, SiO<sub>2</sub>:Al<sub>2</sub>O<sub>3</sub> molar ratios are referred to as well as Si:Al atomic ratios." Blackstock 11, ll. 11–12.

between 0.5:1 and 1.3:1.”<sup>10</sup> Blackstock 13, ll. 30–31 (emphasis added).

Nonetheless, it is well-settled that “all disclosures of the prior art, including unpreferred embodiments, must be considered.” *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976); *see also* Final Act. 15 (“the existence of narrower ranges in Blackstock, even if such ranges are more preferable, do not negate a case of obviousness established by broader ranges taught by Blackstock”).

In sum, we find that the broad range disclosed in Blackstock (i.e., less than or equal to 1.3:1) encompasses the claimed range (i.e., 1.0:2.65 to 1.0:3.3 or 0.377:1.0 to 0.303:1.0) and thus renders the claimed range *prima facie* obvious. *See In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003) (“a prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness”).

Having established a *prima facie* case of obviousness, the burden shifts to the Appellants to show that the claimed invention would not have been obvious to one of ordinary skill in the art. *See id.* (“the existence of overlapping or encompassing ranges shifts the burden to the applicant to show that his invention would not have been obvious”). That burden can be met “either by a showing that the prior art taught away from the invention or by a showing of new and unexpected results relative to the prior art.” *Tyco Healthcare Group LP v. Mutual Pharmaceutical Co., Inc.*, 642 F.3d 1370, 1373 (Fed. Cir. 2011).

The Appellants do not direct our attention to any evidence of unexpected results. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984) (“an applicant relying on comparative tests to rebut a *prima facie* case of obviousness must

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<sup>10</sup> In the Advisory Action, the Examiner finds that “‘just below 0.5:1’ is still substantially close to 0.377:1, in that both endpoints are within rounding or experimental error.” Advisory Action dated February 1, 2017, at 3. The Appellants do not direct us to any evidence to the contrary.

compare his claimed invention to the closest prior art”). The Appellants, however, rely on the following disclosure in Blackstock to show that Blackstock teaches away from the claimed range: “Research has been carried out which found that precursors with a *high alumina content* would result in a *low compressive strength material with little geopolymeric properties.*” App. Br. 8 (original emphasis omitted); Blackstock 9, ll. 31–33. Based on that disclosure, the Appellants argue that one of ordinary skill in the art would not have increased the relative amount of Al beyond the amounts expressly described in Blackstock (i.e., reduced the Si:Al ratio lower than 0.5:1) because he/she would believe that varying the relative ratio of Si:Al would result in a low compressive strength material with little geopolymeric properties. App. Br. 8.

The Appellants’ argument is not persuasive of reversible error. The portion of Blackstock relied on by the Appellants describes the prior art, not the invention disclosed in Blackstock. *See* Ans. 15 (pointing out that “Applicant appears to be relying upon the background information of Blackstock to establish a teaching away, which contradicts the discovery of Blackstock”).<sup>11</sup> Blackstock discloses:

The *present invention* seeks to *alleviate the disadvantages associated with the prior art*. In particular, the present invention provides a geopolymer cement produced from a precursor material having a *relatively high alumina content* [i.e., less than or equal to 1.3:1] which surprisingly, in accordance with the present invention, produces structural building units having *relatively high compressive strength*.

Blackstock 10, ll. 1–5 (emphasis added). Thus, Blackstock does not teach away from the claimed range but rather teaches that a relatively high compressive strength can be achieved with an alumina content having a Si:Al ratio of less than or equal to 1.3:1, which encompasses the claimed range.

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<sup>11</sup> Examiner’s Answer dated July 13, 2017.

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Based on the foregoing, we find that a preponderance of the evidence of record supports the Examiner's conclusion of obviousness. Therefore, the obviousness rejection of claim 1 is sustained.

The Appellants do not present arguments in support of the separate patentability of any of claims 3, 4, 6, and 15–29. Therefore, the obviousness rejections of claims 3, 4, 6, and 15–29 also are sustained.

C. DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED