

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* DIRK WULFF,  
ALEXANDER CENTNER,  
and GERHARD AUCHTER

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Appeal 2007-4002  
Application 10/316,914  
Technology Center 1700

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Decided: August 19, 2008

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Before CHUNG K. PAK, TERRY J. OWENS, and  
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants appeal from a rejection of claims 1-9 and 11-19, which are all of the pending claims.

THE INVENTION

The Appellants claim polymerization processes and products.

Claim 1 is illustrative:

1. A process for preparing aqueous polymer dispersions by at least two-stage free-radical aqueous emulsion polymerization of ethylenically unsaturated monomers in a reaction vessel, comprising:

1. a first polymerization stage, 1, in which a first monomer composition M(1) is polymerized in accordance with a monomer feed technique by adding a free-radical polymerization initiator I(1), giving an aqueous dispersion of a polymer P(1), and

2. a further polymerization stage, 2, in which

2a. a monomer composition M(2) whose makeup is different from that of the monomer composition M(1) is added in undiluted form to the aqueous dispersion of the polymer P(1), and

2b. the monomer composition M(2) is polymerized, and

3. if desired, steps 2a and 2b are repeated to carry out further polymerization stages, (i), in each of which a monomer composition M(i) is added,

the total amounts of the monomers M(2) making up from 0.1 to 20% by weight of the monomers M(1) polymerized in stage 1 and the addition of the monomer mixture M(2) not taking place before the end of the addition of the monomer mixture M(1), wherein the polymerization in polymerization stage 2 and any further polymerization stages takes place in the presence of residual amounts of the initiator I(1) added in the 1st stage or by adding further initiator I(1) and wherein from the beginning of step 1 to the end of step 2b in the last polymerization stage the temperature in the reaction vessel is maintained at at least 70°C.

#### THE REFERENCE

Zhao

US 6,262,144 B1

Jul. 17, 2001

## THE REJECTION

Claims 1-9 and 11-19 stand rejected under 35 U.S.C. § 103 over Zhao.

## OPINION

We affirm the Examiner's rejection.

The Appellants argue only claim 1, which is the broadest claim (Br. 6-12). We therefore limit our discussion to that claim. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007).

The Appellants argue:

The key issues for this appeal relate to the recitations in Claim 1 which specify

- 1) Maintenance of the reaction vessel temperature at at least 70°C throughout the process,
- 2) While using initiator of the same composition throughout [Br. 7].

\* \* \*

Applicants emphasize that they are not asserting that Zhao et al. may not use the same initiator composition throughout. They disclose it for instance in Example B7. They do not however disclose, in fact they teach away from, requirement (1) as to the temperature in the reactor vessel, and more particularly, as further limited by requirement (2) [Br. 10].

Zhao discloses:

It is particularly advantageous, when adding the monomers to be polymerized in a stage i to the polymerization vessel, substantially to interrupt the polymerization, in other words to carry out the polymerization of the monomers to be polymerized in stage i only after having added the total amount of the monomers to be polymerized in stage i to the polymerization vessel [col. 3, l. 63 – col. 4, l. 2].

\* \* \*

As already mentioned, the polymerization can be interrupted by measures such as temperature reduction, addition of polymerization inhibitors (free-radical scavengers such as hydroquinone, for example), consumption of initiator, etc [col. 4, ll. 6-10].

\* \* \*

Furthermore, it is normally and in accordance with the invention of advantage if the addition, in the case of substantially interrupted polymerization, is made at elevated temperature, for example at from 50 to 95° C. or from 60 to 80° C. Elevated temperatures of this kind normally accelerate the desired dissolution and swelling process [col. 4, ll. 16-22].

Zhao teaches that it is expedient to cool the reaction mixture between polymerization stages (col. 13, ll. 14-15). In view of the above disclosures, however, one of ordinary skill in the art would have been led, through no more than ordinary creativity, to alternatively use the other methods disclosed by Zhao for substantially interrupting the polymerization between polymerization stages, i.e., adding a polymerization inhibitor or consuming the initiator (col. 1, ll. 55-65; col. 4, ll. 6-10). *See KSR Int'l. Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007) (In making an obviousness determination one “can take account of the inferences and creative steps that a person of ordinary skill in the art would employ”).

The Appellants’ claim 1 recites “wherein the polymerization in polymerization stage 2 and any further polymerization stages takes place in the presence of residual amounts of the initiator I(1) added in the 1st stage or by adding further initiator I(1)”. That claim limitation permits the initiator I(1) added in the first stage to be depleted in that stage such that there is no residual amount of initiator I(1) added in the first stage, in which

case the second stage polymerization is effected by further addition of initiator I(1). Zhao's substantial interruption of the polymerization by consuming the initiator (col. 4, ll. 6-10) is comparable to the Appellants' depletion of the initiator in the first stage, which likewise would cause substantial interruption of the polymerization.

One of ordinary skill in the art would have appreciated that substantially interrupting Zhao's polymerization by consuming the initiator or by adding a polymerization inhibitor would avoid the expenditure of energy and time required to substantially interrupt the polymerization by cooling the reaction mixture (Appellants' Spec. 2:11-14), which then would have to be reheated.<sup>1</sup> Maintaining the temperature in Zhao's reaction vessel anywhere within Zhao's 50-95°C range (col. 4, ll. 14-20) throughout the polymerization process, and bringing about the desired substantial interruption of the polymerization by consuming the initiator or by adding a polymerization inhibitor, would have been *prima facie* obvious to one of ordinary skill in the art to avoid those disadvantages of using reaction mixture cooling to substantially interrupt the polymerization.

One of ordinary skill in the art would have been led to effect the second stage polymerization using the same polymerization initiator used in the first polymerization stage by Zhao's disclosure of using the same polymerization initiator in both stages (Example B7).

For the above reasons we are not persuaded of reversible error in the Examiner's rejection.

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<sup>1</sup> Hence, we are not convinced by the Appellants' argument that maintaining the reaction vessel temperature is contrary to accepted wisdom (Br. 11).

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DECISION

The rejection of claims 1-9 and 11-19 under 35 U.S.C. § 103 over Zhao 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).

AFFIRMED

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