

Bubble Removal from Photoresist using SuperPhobic[®] Contactors Does Away with Down-Time at Semiconductor Site

A semiconductor manufacturer has successfully removed the down time that they used to experience due to problems with bubble formation in their photoresist solution. This company mixes their own photoresist. Historically, they used to let the tank vent to the atmosphere for 4-5 hours and wait for the bubbles to come to the surface. The difficulty with simply venting the excess gas is that the photoresist solution is still saturated with gases at the conditions where the solution was vented. Any further pressure reductions and/or temperature increases will create additional bubbles. It also takes a long time to vent bubbles using the open tank method.

This customer now successfully uses a SuperPhobic[®] Membrane Contactor to remove the bubbles from their photoresist solution right after mixing it and immediately before applying it to their substrate. Placing a SuperPhobic Membrane Contactor inline eliminates any bubble formation.

The Application Specifics

Photoresist with a viscosity of 20 cP at 100° F is run through a

SuperPhobic contactor at 5 gpm. A 27.5" Hg vacuum is used to lower the partial pressure of the gas phase inside of the contactor and create a driving force to remove the bubbles from the photoresist solution. The estimated bubble removal in one pass through the membrane contactor is 99% removal and there are no visual signs of any bubbles being present at the outlet of the contactor. The customer plans to increase the flow rate to 20 gpm in the future. The design of the contactor allows for changes in flow conditions without having to add additional equipment.

The customer stated, "Our only disappointment was that we didn't get to this sooner. I've spent many late nights trying to troubleshoot air bubbles in the photoresist. The contactor sold itself to management."

A polyolefin Hollow Fiber Membrane that does not wet out when put in contact with low

surface tension fluids provides the support medium and surface area allowing the gas and a liquid phase to come in direct contact with each other.

A vacuum phase is maintained on the lumenside (inside) of the hollow fibers while the liquid photoresist solution flows on the shellside (outside) of the hollow fibers. The vacuum creates a partial pressure differential inside of the lumens and the bubbles travel from the liquid phase through the pores of the membrane into the lumens. The vacuum then carries the bubbles out of the lumens and the solution is bubble free.

Many manufacturing processes, analytical measurements, and other industrial processes and procedures that involve aqueous based solutions, are adversely affected by bubbles in the fluid stream. SuperPhobic Membrane Contactors provide a very simple, cost effective solution to eliminate bubbles from the process.

For more information on bubble removal and our Membrane Contactors, please call us or visit our website at www.liqui-cel.com.

This product is to be used only by persons familiar with its use. It must be maintained within the stated limitations. All sales are subject to Seller's terms and conditions. Purchaser assumes all responsibility for the suitability and fitness for use as well as for the protection of the environment and for health and safety involving this product. Seller reserves the right to modify this document without prior notice. Check with your representative to verify the latest update. To the best of our knowledge the information contained herein is accurate. However, neither Seller nor any of its affiliates assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of the suitability of any material and whether there is any infringement of patents, trademarks, or copyrights is the sole responsibility of the user. Users of any substance should satisfy themselves by independent investigation that the material can be used safely. We may have described certain hazards, but we cannot guarantee that these are the only hazards that exist.

Liqui-Cel, Celgard, SuperPhobic and MiniModule are registered trademarks and NB is a trademark of Membrana-Charlotte, A division of Celgard, LLC and nothing herein shall be construed as a recommendation or license to use any information that conflicts with any patent, trademark or copyright of Seller or others.

©2007 Membrana - Charlotte A Division of Celgard, LLC

(TB24Rev3_10-05)

Membrana - Charlotte
13800 South Lakes Drive
Charlotte, North Carolina 28273
USA
Phone: (704) 588 5310
(800) 235 4273
Fax: (704) 587 8585

Membrana GmbH
Oehder Strasse 28
42289 Wuppertal
Germany
Phone: +49 202 6099 - 658
Phone: +49 6126 2260 - 41
Fax: +49 202 6099 -750

Membrana - Japan
Shinjuku Mitsui Building, 27F
1-1, Nishishinjuku 2-chome
Shinjuku-ku, Tokyo 163-0427
Japan
Phone: 81 3 5324 3361
Fax: 81 3 5324 3369



MEMBRANA
Underlining Performance

www.membrana.com
www.liqui-cel.com

A **POLYPOR** Company