Module for Oxygenating Water Without Generating Bubbles

No bubbles were observed at any of the test flow rates.

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A module that dissolves oxygen in water at concentrations approaching saturation, without generating bubbles of oxygen gas, has been developed as a prototype of improved oxygenators for water-disinfection and water-purification systems that utilize photocatalyzed redox reactions. Depending on the specific nature of a water-treatment system, it is desirable to prevent the formation of bubbles for one or more reasons: (1) Bubbles can remove some organic contaminants from the liquid phase to the gas phase, thereby introducing a gas-treatment problem that complicates the overall water-treatment problem; and/or (2) in some systems (e.g., those that must function in microgravity or in any orientation in normal Earth gravity), bubbles can interfere with the flow of the liquid phase. The present oxygenation module (see Figure 1) is a modified version of a commercial module that contains >100 hollow polypropylene fibers with a nominal pore size of 0.05 µm and a total surface area of 0.5 m². The module was originally designed for oxygenation in a bioreactor, with no water flowing around or inside the tubes. The modification, made to enable the use of the module to oxygenate a disk becomes shadowed from its central stellar object depends on radial mass flow and (2) most planet formation has occurred in environments unheated by stellar radiation.

This work was done by K. R. Bell and P. M. Cassen of Ames Research Center, J. T. Wasson and D. S. Woolum of the University of California, and H. H. Klahr and Th. Henning of the Max Planck Society (Jena, Germany). Further information is contained in a TSP (see page 1).

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