

CERAMIC BULLETIN

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Annealing Optical Fiber

Precision Molding
Phosphate Glasses

Microwave Synthesis
of Alumina Powders

Advance Program—
102nd Annual Meeting

Literature Showcase

Profiles in Ceramics:
S. Donald Stookey

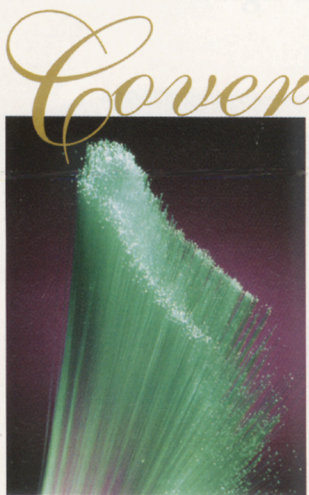




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S. Donald Stookey **38**

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Optical fibers present a dramatic display of light. Photo courtesy of Corning Inc., N.Y.

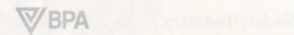
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The *American Ceramic Society Bulletin* covers news and activities of the Society and its members, includes items of interest to the ceramic community, and provides the most current information concerning all aspects of ceramic technology, including research and development, manufacturing, engineering and marketing.

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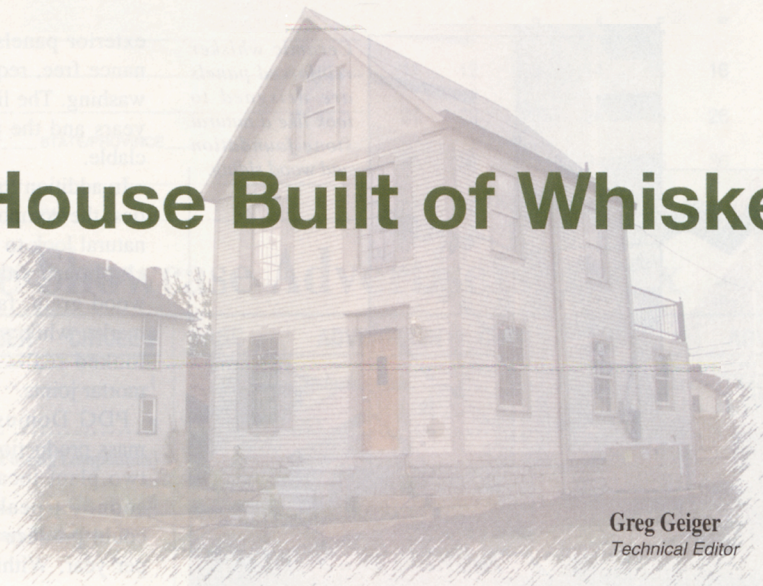
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A House Built of Whiskers



Greg Geiger
Technical Editor

PDG Domus (Columbus, Ohio) has put a new spin on home construction. Houses are prefabricated in segments at a factory using steel framing and an exterior shell made of ceramic whisker reinforced resin. The interior of the house is finished with conventional materials—drywall, glass windows and wooden doors. Once produced, the houses can be assembled in two days as compared with up to a year for traditional home construction.

PDG Domus built the first of these houses in Columbus, Ohio's Victorian Village neighborhood. At first glance, the 1400-ft² Victorian-style house looked like most of the other houses in the neighborhood. Even upon closer inspection, it looks like a typical Victorian home—complete with a slate roof, box gutters, stone foundation and clapboard siding.

But the exterior components are far from traditional. The roof, gables, siding and foundation are all made of what Nathan Pingel, PDG's CEO and director, calls a "ceramic laminate." According to Pingel, a lot of research and development went into the ceramic laminate exterior components.

They are produced in a ceramic mold by pumping in multiple layers of a composition comprised of super-durable resin, ceramic whiskers and dehydrated aluminum. There are more than 20 layers; each tailored with

varying amounts of each material and with ceramic whiskers of variable lengths.

The whiskers are wollastonite based and are supplied to PDG Domus by Ceramic Technologies Corp., Rowley, Iowa. These patented whiskers are micron size and have an aspect ratio of 15.

Whisker content on some layers can be more than 80%. Once all the layers are in place, the mold is covered, put under a vacuum and the composite is

cured. The finished panels are ~1 cm thick. Panels can be quite large, ranging from 10 × 10 ft. (300 lb) to 10 × 30 ft. (600 lb).

The laminate panels have some impressive properties, due in large part to the ceramic whiskers. These include a flame spread under 20 (normal for a traditional wood house is 400), an insulation rating of 10–12R (the total insulation rating for the house is 50R), no outgassing and a flexural strength of ~174 MPa. The



The exterior of the house is made entirely of the ceramic whisker reinforced resin composite, including the door and window frames, shutters, and roof.

A HOUSE BUILT OF WHISKERS




Ceramic whisker reinforced panels are designed to look like a natural stone foundation and wood siding.

Prefabricated segments allow the house to be assembled in a few days.

exterior panels are virtually maintenance free, requiring only occasional washing. The life of the house is 150+ years and the panels are 100% recyclable.


In addition to the impressive properties, the composite panels have a very natural look to them. For example, the clapboard siding is complete with wood grain, faux knotholes and nail marks, while stone foundation panels looked realistic, even down to the mortar joints.

PDG Domus is expected to start mass production of the new houses at two plant locations located in Ohio soon. At peak production, a plant could produce more than 700 houses per year. Within two years, the company hopes to have manufacturing plant franchises across the country. The cost for the houses will range between \$50,000-300,000. ■



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 Tosoh Corporation, Advanced Ceramics Dept. 1-7-7, Akasaka, Minato-ku, Tokyo 107 Tel:03-3585-0801 Fax:03-3585-4055