

cured mill block of approximately 10x10 mm cross section by 3-4 cm long. Blocks were heat treated in an oven by placing them in a cool oven. The oven was then heated to 100° C. and maintained at that temperature for one hour. The oven was then turned off and the samples were allowed to cool in the oven to room temperature.

Each sample was evaluated for cuttability and Barcol Hardness. Barcol Hardness of the composite blanks was tested with a Barber Coleman Impressor Model GYZJ 934-1 (Barber Coleman; Rockford, Ill.). An average of the three readings was recorded.

Cuttability is calculated by the following equation, percent increase compared to Sample 8 equals [(Cuttability-Cuttability of Sample 8)/Cuttability of Sample 8] multiplied by 100.

TABLE 5

Sample No.	Filler or Product	Filler wt %	Cuttability: Avg Depth (mm)	% Increase of Cuttability Compared to Sample 8	Barcol-avg
1	Sol-gel	70	0.93	70	79.3
2	Glass	70	0.71	29	86.0
3	Quartz	70	0.72	32	77.3
4	Fumed Silica	60	0.56	2	78.3
5	Sol-gel	80	1.24	127	85.0
6	Quartz	80	1.45	166	80.3
7	Glass	60	1.05	93	75.5
8	Fumed Silica	50	0.55	0	75.0
9	Sol-Gel	85.3	2.01	268	89.5
Comparative 10	Vita Mark II A3C/I12 (no heat treatment)		0.83	44	—

Sample 11

3M F2000 shade A2 (3M Co.; St. Paul, Minn.), fluoride-releasing material, was extruded into a cuvet to about ¾ full. The filled cuvet was placed standing vertically in a Hanau Sun-Test box with a xenon lamp and exposed to light for 30 min. The cuvet was rotated lengthwise and exposed to light another 30 min. The cured block was heat treated in a Despatch oven at 100° C./60 min., then allowed to cool in the oven.

X-Ray Analysis of Samples

Examples X1-X8 were fabricated in the same way as Samples E-I except that they were centrifuged at 2700 RPM, and light cured for 30 minutes immersed in water; and not heat-treated.

Examples X9-X12 were fabricated in the same way as Sample E-I except that they were centrifuged at 2700 RPM, and light cured for 41 minutes immersed in water; and heat-treated in the same way as samples 1-9.

Examples X13-X22 were fabricated in the same way as Samples E-I except that they were centrifuged at 2700 RPM, and light cured for 30 minutes immersed in water; and heat-treated in the same way as samples 1-9.

Example X23 was fabricated in the same way as Samples E-I except that it was centrifuged at 2400 RPM, and light cured for 30 minutes immersed in water; and heat-treated in the same way as samples 1-9.

Examples X24-28 are commercial Vita Mark II Vitablocs.

Examples X29-X32 were fabricated in the same way as Samples A-D except that the paste was heated to 45° C. for filling.

TABLE 6

Sample #	Exposure time (sec)	Observation
X1	1/30	many pores, ~0.5-2 mm
X2	1/30	no cracks or other discontinuities visible
X3	1/30	no cracks or other discontinuities visible
X4	1/30	no cracks or other discontinuities visible
X5	1/30	several pores 1-4 mm
X6	1/30	no cracks or other discontinuities visible
X7	1/30	no cracks or other discontinuities visible
X8	1/30	no cracks or other discontinuities visible
X9	1/30	no cracks or other discontinuities visible
X10	1/30	no cracks or other discontinuities visible
X11	1/30	large pit at end open to surface

TABLE 6-continued

Sample #	Exposure time (sec)	Observation
X12	1/30	large pit at end open to surface
X13	1/30	flat pores, about 0.1 mm thick x 3 mm long
X14	1/30	flat pores, about 0.1 mm thick x 3 mm long
X15	1/30	flat pores, about 0.1 mm thick x 3 mm long
X16	1/30	flat pores, about 0.1 mm thick x 3 mm long
X17	1/30	no cracks or other discontinuities visible
X18	1/30	no cracks or other discontinuities visible
X19	1/30	no cracks or other discontinuities visible
X20	1/30	no cracks or other discontinuities visible
X21	1/30	flat pores, about 0.1 mm thick x 3 mm long
X22	1/30	flat pores, about 0.1 mm thick x 3 mm long
X23	1/30	one pore ~3 mm; one crack ~5 mm long
X24	1/30	no cracks or other discontinuities visible
X25	1/30	no cracks or other discontinuities visible
X26	1/30	no cracks or other discontinuities visible
X27	1/30	no cracks or other discontinuities visible
X28	1/30	no cracks or other discontinuities visible
X29	1/30	no cracks or other discontinuities visible
X30	1/30	narrow longitudinal crack 0.1 mm wide top to bottom
X31	1/30	small crack ~0.1 mm wide
X32	1/30	small crack <0.1 mm wide

We claim:

1. A method of making a dental mill blank suitable for the oral environment comprising:
  - mixing a paste comprising a resin and a filler,
  - adding a fluoride releasing material to the pastes,
  - shaping the paste into a desired configuration,
  - minimizing material discontinuities from the paste,
  - curing the paste into a blank, and
  - heating the blank to a temperature at or above the Tg of the resin for a time sufficient to relieve internal stresses in the blank, wherein the cured mill blank, when