

# 1345 Temperature Influence on the Depth of Cure of a Composite

[P. BURTSCHER](#), IVOCLAR AG, Schaan, Liechtenstein, and V. RHEINBERGER, Ivoclar Vivadent AG, Schaan, Liechtenstein

Objectives: With the use of the Calset System a composite is polymerized at 54 °C. It is claimed that curing at elevated temperatures results in better curing with a higher depth of cure, but no data is available on the influence of the temperature on the depth of cure.

Methods: Four different monomer formulations with a refractive index of 1.47 – 1.53 were mixed together by altering the TEGDMA / Bis-GMA ratio. The monomers were initiated with 0.3 % CC and 0.6 % Amin. Composites were made by mixing these monomers with a Sr-Glassfiller with a refractive index of 1.50. (70 % filler ratio). The depth of cure of all composites was measured at 20 °C, 60 °C and 100 °C according to ISO-4049 (curing time 10 sec, light intensity: 300 mW/cm<sup>2</sup>). The data were analyzed by ANOVA, significance level was set at p=0.05.

Results: Depth of cure measurements (values in mm)

Refractive Index	20°C	60°C	100°C
1.537	4.3 ± 0.03	5.2 ± 0.09	5.5 ± 0.06
1.524	5.0 ± 0.07	5.3 ± 0.07	5.7 ± 0.08
1.497	5.6 ± 0.04	4.2 ± 0.10	3.5 ± 0.06
1.470	3.1 ± 0.13	2.4 ± 0.03	2.0 ± 0.05

Conclusions: The results show, that the temperature of the composite has a significant effect on the depth of cure. If the refractive index of the monomer is significantly higher than the refractive index of the filler, there is an increase in the depth of cure at higher temperature. If the refractive index of the monomer is lower than the refractive index of the filler, there is significant decrease in the depth of cure at elevated temperature. This can be explained because the refractive index of the monomer changes with temperature, whereas the refractive index of the filler is not influenced by the temperature.

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