## O-6 Color changes in composite resins exposed to xenon lamp

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### Ⅰ. Objectives

The purpose of this study was to evaluate the effect of selected shade on the potential degradation of color. Color changes resulting from xenon lamp exposure in air or water were evaluated quantitatively on different shades of composite resin.

### Ⅱ. Materials and Methods

Composite resin(Filtek™Z 250, shade A1, A2, A3, A3.5, A4) were applied in a cylindrical metal mold(0.5 mm thickness, 15 mm diameter). The 75 specimens were divided into three groups of 25 specimens each.

Group Ⅰ : the specimens was foiled during exposure to the xenon lamp for 24 hours and 7 days.

Group Ⅱ : the specimens was exposed to the xenon lamp in air for 24 hours and 7 days.

Group Ⅲ : the specimens was exposed to the xenon lamp under water for 24 hours and 7 days.

The color characteristics($L^*$,$a^*$,$b^*$) of the specimens before and after exposure of xenon lamp were measured by spectrophotometer and the total color difference($\Delta E^*$) was computerised. The total color difference to shade and exposure environment of xenon lamp were statistically analysed by One-way ANOVA test, Tukey's HSD signed ranked test. Data to exposure period of xenon lamp wre statistically analysed by paired t-test. The relationship between $\Delta L^*$, $\Delta a^*$, $\Delta b^*$value and $\Delta E^*$ used Regrssion anaylsis.

### Ⅲ. Results

The results of this study were as follows:

1. The discoloration that occurred in dental composites that were subjected to xenon lamp exposure demonstrated changes in lightness and chromaticity coordinates that resulted in overall discoloration.
2. The lighter the shade was, the higher the tendency for discoloration($p<0.05$).
3. All specimens showed increased discoloration after for 7 days of exposure to xenon lamp($p<0.05$).
4. The major changes of group Ⅰ and Ⅱ in CIE $L^*a^*b^*$ color space occurred through a shift of the $b^*$ coordinate to a more positive value, namely, toward an increasing yellowness($p<0.05$).
5. The major changes of group Ⅲ in CIE $L^*a^*b^*$ color space occurred through a shift of the $L^*$ coordinate to a more negative value and the $b^*$ coordinate to a more positive value, namely, toward an increasing darkness and yellowness ($p<0.05$).

### Ⅳ. Conclusions

The lighter shades of composite resins were likely to be subject to higher color degradation through environmental effects of xenon lamp exposure. Color degradation was occurred primarily as an increase in yellowness and darkness.