

INVESTIGATE THE OXYGEN ABSORPTION OF USED CONTACT LENSES BY LIBS

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Abstract

To detect the variation of absorbed oxygen in contact lens by Laser Induced Breakdown Spectroscopy, (LIBS) in order to study the changes in the contact lenses' absorption behavior along the central optical axes of a contact lens when worn over a period of time. Laser Induced Breakdown Spectroscopy (LIBS) provides accurate results both quantitative and qualitative, not only in the changes in the contact lens absorption behavior for the oxygen content of the whole lens but also in a particular spot on the lens's surface. Nd:YAG laser (Quantel-Berlight), 1.06 μm wavelength, 5 nsec pulse width and 15 mj energy, was used to produce plasma by focusing laser beam with 10 cm focal length convex lens on the center of the contact lens. Two fresh pairs of yearly, monthly and daily contact lenses were used as a reference. Forty yearly used colored, and non-colored contact lenses (extended wear) collected from female medical students (Age range: 18-20 years old) were analyzed immediately after being received from the subjects (all lenses investigated in this research were used for a complete one year). The study showed that the left yearly used contact lenses' absorption of oxygen is less than that of the right used contact lenses, but in the yearly fresh contact lenses the ratio of oxygen absorption shows no change. Oxygen content of the contact lens increased rapidly with the increasing used time, and there was noticeable variation of absorbed oxygen between right and left lenses for the same user.