The Analysis of Contact Lenses as Forensic Evidence Using FT-IR and Refractive Index

Rachel Bracker, Barbara Wheeler, and Lori J. Wilson

Department of Chemistry

Eastern Kentucky University

Richmond KY, 40475 USA

Very little research has been reported on the use of instrumental analytical techniques for the forensic examination of contact lenses. However, Chemical and Engineering News projects we will see an increase in the need for corrective eyewear within the next several generations. With the increasing potential of contact lenses being found at crime scenes and their need for analysis, I have devised two methods for analysis of contact lenses using a benchtop FT-IR and an Abbe Refractometer. A benchtop FT-IR identifies the functional groups present in the polymer allowing the analyst to differentiate between different brands. An Abbe Refractometer can be used to find the refractive index (RI) of the contact lens, and therefore hopefully find the prescription of the lens.  
  
Ten contact lenses were analyzed using FT-IR and the spectra obtained distinguished between the different polymers used by each brand. RI 1.332-1.400 were observed for 8 contact lenses, with prescriptions between -3.75 and +3.50 using the Abbe Refractometer. Testing to determine the consistency of these results is ongoing and will be discussed in the presentation.  
  
Contact lenses have the potential to become helpful pieces of evidence in the forensics field and this study seeks to give forensic analysts a procedure for instrumental analysis. FT-IR can distinguish between different polymers which make up contact lenses, and an Abbe Refractometer has the potential to differentiate between prescriptions using the RI.