

Laser induced breakdown spectroscopy: A real time approach to identify the glass and crystal samples

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Abstract

In current era, glasses and crystals has been widely used for advanced optical devices. We present hear the use of a real time online technique, known as laser induced breakdown spectroscopy (LIBS) to identify the rare earth doped glasses and identify the various quartz crystals. In this technique, a high energy beam from a Q- switched pulsed Nd: YAG laser was used to focus on top of the sample surface. The intense intensity at the focal spot is able to ablate the part of the sample material in the plasma from. The ionized atoms from sample in the plasma plume recombines with the electrons and emit light at signature wavelengths of elements present in the sample. The light emitted is carried to Ocean Optics spectrometer (LIBS2500 plus) by group of optical fibers. This spectrometer can analyze in the spectral range of 200 nm to 980 nm. The spectrum was processed by OOILIBSplus (v1.0) software. Ten individual spectrums of each sample were recorded and averaged to get a final spectrum for analysis. The advantage of LIBS technique is that no sample preparation is required and laser causes extremely minimal damage to the sample surface. One can identify the dopant in glasses and crystals and distinguish them very easily using the LIBS technique. Besides, the effect of change in glass composition to LIBS signal has been studied.

Biography

Akshaya Kumar has completed his Ph.D from Banaras Hindu University, India and postdoctoral experience from Mississippi State University, USA. He is currently working as associate professor in Department of Physics at Tuskegee University, Alabama. He has published more than 15 papers in reputed journals in area of spectroscopy of glasses, laser induced breakdown spectroscopy and polymers.