

Development of a Visible Photoluminescence Microspectrometer

Abstract

Photoluminescence (PL) is the process by which light is absorbed and re-emitted by a material. In solid-state physics, PL is an important characteristic measurement for studying the electron band structure of molecules. This work sought to design and build a simple instrument which can accurately measure PL in thin-film materials on a micron spatial scale. We accomplish this by coupling a diode laser system to a metallurgical microscope, using optical filters to block light reflected by the sample. The instrument is equipped with a digital camera for imaging, and a commercial spectrometer for measuring PL spectra. We demonstrate the effectiveness of the instrument on samples of organic photovoltaic crystals and transition-metal dichalcogenide thin films.