

## **Structural and optical properties of PbI<sub>2</sub> nanostructures obtained using the thermal evaporation method**

### **Abstract**

Lead iodide (PbI<sub>2</sub>) nanostructures were successfully prepared using the thermal evaporation method on a glass substrate at room temperature. The structural properties were analyzed using X-ray diffraction, which revealed that the crystal size increases as thickness increases. Crystal size was calculated to be in the range 27.3-61.08 nm. In addition, the preferred growth orientation was (001) for all samples. The surface morphologies using scanning electron microscopy have shown an increasing of grain size with increasing thickness. Also, optical properties using ultraviolet-visible spectroscopy were researched as a function of thickness. The absorption data have indicated direct transmission with optical energy band gap that varies continuously from 2.35 to 2.40 eV at room temperature. The refractive index and optical dielectric constant were investigated to verify the suitability of the model for electro-optical systems. The low fluctuation in energy band gap indicates that the grain size is quite small. The obtained results are in good agreement with experimental and theoretical data.

### **Keywords**

Electro-optical systems; Glass substrates; Lead iodide (PbI<sub>2</sub>)