

## **Photopyroelectric characteristics of Pr<sub>6</sub>O<sub>11</sub> - ZnO ceramic composites.**

### **ABSTRACT**

Characteristics of different Pr<sub>6</sub>O<sub>11</sub> ceramic composites were studied using photopyroelectric spectroscopy. The amount of Pr<sub>6</sub>O<sub>11</sub> in the composite was varied from 0.1 to 0.75 mol% at the sintering temperature of 1190 and 1270°C. It was found that optical energy band-gap ( $E_g$ ) of the composite is reduced by increasing the amount of Pr<sub>6</sub>O<sub>11</sub> in the composite at both sintering temperatures. However, the decrease in  $E_g$  was relatively less at a sintering temperature of 1270°C as compared to that of 1190°C. XRD analysis showed that all samples have two phases, that is ZnO and intergranular layers composed of Pr<sub>6</sub>O<sub>11</sub> and few small peaks of Pr<sub>2</sub>O<sub>3</sub>. EDAX results further showed that the Pr<sub>6</sub>O<sub>11</sub> and Pr<sub>2</sub>O<sub>3</sub> were segregated in the grain boundaries. Maximum grain size of 5.85  $\mu\text{m}$  and relative density of 94.5% were found in these ceramics at  $x = 0.1$  and 0.5 mol%, respectively, for 1270°C sintering temperature.

**Keyword:** Photopyroelectric spectroscopy; Optical energy band gap; Pr<sub>6</sub>O<sub>11</sub>; ZnO.