Forensic Classification of Glass Employing Refractive Index Measurement

Abstract

Burglary and accident cases may involve glass fragments as physical evidence found at the crime scene. In forensic investigation, the major physical examination to determine the origin of glass is refractive index (RI) measurement. It was therefore of interest to determine RI measurements of several types of glasses commonly found in Malaysia with a view of classifying glass as building and automobile glasses. Twenty samples of glass from each classification were collected from car workshops and glass pane shops. Determination of RI value was affected using Glass Refractive Index Measurement 3 (GRIM3) instrument. From this study, the RI values of automobile glass can be classified into 3 types according to their RI values and thickness. Windscreen glass was found to be in the RI range of 1.5152 – 1.5225, rear screen glass with RI of 1.5147- 1.5217 and side window glass with RI range of 1.5188-1.5190, all samples with thickness of between 2 – 6 mm. Building glass can be classified into heat absorbing float (1.5197 – 1. 5211), clear float (1.5189 – 1.5213), figured float (1.5164 – 1.5234) and reflective float (1.5167 - 1.5188) with sample thicknesses of 2 – 6 mm. The results show that each glass type has different range of RI value which is related to thickness, manufacturer and colour due to its end-use. Thus, the origin of glass according to its end-use types could be determined by the relationship between RI and thickness to assist forensic scientists in their investigation.