

# ATR FT-IR Spectra of Faceted Diamonds

Pimthong Thongnopkun<sup>a</sup>, and Sanong Ekgasit<sup>\*,b</sup>

<sup>a</sup>Burapha University, Chanthaburi IT Campus, Thamai, Chantaburi 22170, Thailand

<sup>b</sup>Sensor Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University,  
Bangkok 10330, Thailand

## ABSTRACT

Attenuated total reflection Fourier transform infrared (ATR FT-IR) spectroscopy has been employed for characterization of faceted diamonds. ATR spectra of round brilliant cut natural diamonds of ~0.1 ct were observed with excellent spectral quality. The mirror-flat spectrum of the table facet enables a good contact to the ATR crystal with a minimal applied pressure. The observed ATR spectra agreed very well with the diffuse reflectance and transreflectance spectra. The detailed spectral information in the one-phonon region of diamonds with high nitrogen impurities can be clearly observed in the ATR spectra but those in the diffuse reflectance and transreflectance spectra were obscured by the saturated absorption. The strong evanescent field under the ATR condition enables spectral acquisition of a thin film on the mirror-flat surface of the faceted diamonds. The spectral signatures of this thin film were not observable in the diffuse reflectance or the transreflectance spectra.