

Application of surface plasmon resonance sensor in detection of water in palm-oil-based biodiesel and biodiesel blend

ABSTRACT

In this paper, we present an optical method based on surface plasmon resonance and using the Kretschmann configuration for the detection of water in biodiesel and biodiesel blend. Measurements were carried out at room temperature using a He-Ne laser (632.8 nm, 5 mW) as the monochromatic light source. Two samples, pure palm oil biodiesel (B100) and biodiesel plus diesel fuel (B50) were chosen for angle scan measurements. When the water concentration was changed from 1 to 100 ppm, the resonance angle increased linearly. The real and imaginary parts of the refractive index also increased linearly with the concentration. All data were collected after the sample mixture reached a stable stage. Prior to the data collection, data on the kinetic behavior showed that the resonance angle decreased exponentially with time up to about 50 min or longer before a stable stage can be achieved.

Keyword: SPR sensor; Biodiesel; Biodiesel blend