

## CHAPTER V

### CONCLUSIONS

Homemade diamond micro-ATR sensor was successfully employed to solve optical contact problem in ATR technique for analyzing hard rigid samples. This technique takes advantage of total internal reflection phenomenon at the pavilion facet of the cut diamond. By adjusting the table facet of diamond perpendicular to the propagating direction of the infrared beam, the infrared beam can be focus at the culet of diamond and transfectance infrared beam can be collected.

Diamond micro-ATR sensor can be employed for various types of samples including hard and rigid polymers, curved surface polymers, rough surface polymers, thin film polymer on metal. The technique cannot only be employed for hard and rigid samples, but also for the small sampling area. Due to the fast measurement time, no sampling preparation, and simplicity of the technique, it is more reliable than using conventional ATR technique. Unlike conventional diamond objective lens or commercial diamond micro-ATR, the homemade accessory requires little cleanup, no fragile or hygroscopic optical materials.

Compare to the ATR spectra using conventional ATR accessory, the spectra of soft polymers obtained by homemade diamond micro-ATR sensor is the same as those obtained by conventional ATR. In multi-coating polymer, sharp tip diamond micro-ATR sensor can be observed component beyond the surface sample while conventional ATR sampling cannot be performed because of its small sampling depth.

### Suggestion for future work

Selected position in hundred microscales is difficultly made in diamond micro-ATR sensors. If the diamond micro-ATR sensor has been improved, the direction of screw thread where is placed the sample can be well controlled, selected position on surface sample is easy. For the sample with various sampling areas, selection of appropriated size of diamond micro-ATR sensor can be achieved. Moreover, single fiber characterization in forensic analysis can be made. The application of diamond micro-ATR sensors will cover fiber industry, which is increasingly impact role on business scale, and it is important to be able to differentiated different fiber types, especially in products such as carpets.



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