CHAPTER V
CONCLUSIONS

The successful preparation of organically modified montmorillonite with bis (hydrogenated tallowalkyl) dimethyl quaternary ammonium chloride was done by ion exchange reaction. The TGA results of organophilic-clay demonstrated some interaction between modifying agent and silicate layers. In addition, AAS and WAXD techniques approved that most of Na^+ ions were exchanged and the modifyimg agent was intercalated into silicate layers. Futhermore, FTIR can verify the incorporation of modifying agent into the structure of clay.

PPV/layered silicate nanocomposites where organically modified montmorillonite was dispersed at the molecular level has been synthesized via solution and thermal elimination of the sulfonium group from poly(xylylene tetrahydrothiophenium chloride)-clay nanocomposites. The photoluminescence extraction from the scales of seabass-clay nanocomposites were also prepared by means of solution techniques. All of organic-inorganic hybrid light-emitting nanocomposites in this study can be classified as intercalated type confirmed by WAXD and TEM. The FTIR spectra of the nanocomposites exhibited the presence of characteristic aborption due to both the organic and specific filler component. However, thermal stability of polymer-clay nanocomposites in nitrogen atmosphere with various clay loading did not show significance change.

The characteristic brought by the nanocomposites structure represented improvement in barrier property, color tunability, and environmental stability. Water absorption of polymer/layered silicate nanocomposites was reduced as compared to pure polymer owing to increasing the tortousity of the path of diffusing moisture through the nanocomposites.

Increasing intercalation level showed a shift of photoluminescence peak wavelength toward lower energy. This characteristic, therefore, attributed to an intercalation-induced conformational transition from a "compact coil" to expanded coil" which lead to an increase in the effective conjugation length.

Moreover, the dramatic improvement of environmental stability was given by the intercalated structure on polymer-clay nanocomposites. The

photoluminescence intensity of the nanocomposites tended to decrease more slowly with irradiating time than that of the pristine polymer.

Organic light-emitting diodes based on PPV and protein extracted from the scales of seabass intercalated clay nanoparticles have been fabricated by spin-coating method. Light-emitting devices demonstrated current-voltage characteristic with good operating stability.

In conclusion, the addition of organically modified clay nanoparticles to light-emitting devices based on PPV and photoluminescence extraction from the scales of seabass was a great class of very promising new materials of color-tunability and environmental stability for optoelectronic applications.