

**X-ray Photoelectron Analyses of the water adsorbed on Polyethylene containing Sodium Alkene Sulfonate.**

-Estimation of the electric conduction layer thickness on the polyethylene-

Akihiro Aso and Sigeo Tanuma

Japan Energy ARC.Co.Ltd.

3-17-35 Niizo-Minami,Toda,Saitama335

We have carried out the X-ray photoelectron analysis of the water adsorbed on the low density polyethylene(LDPE) contained sodium alken sulfonate(SAS). The specimens were stood for 24 hours in the atmosphere of 40% ,50% and 90% humidity, respectively. In order to prevent the sublimation of water adsorbed on the sample surface, the sample surface was covered with the ice before inserting the sample into the vacuumed chamber. We have carried out the depth profiling analyses of O1s and C1s peaks removing the ice covered on the specimen surface by x-ray bombardment.

The resulting depth profiling analysis, showed that the adsorbed water on the sample surface was interacted with SAS, the layer of which may consisted of electric conduction layer. we also found it does not sublimate by the X-ray bombardment. The resulting thickness of the electric conduction layer on the LDPE (contained 3wt.%SAS), which was stood for 24 hours in the atmosphere of 90%humidity, was ca.1.8 nm and that of 50% and that of 40%humidity was ca.0.8 nm. We concluded that the electric conduction layer was formed at the interface of LDPE and ice layer. And the thickness of the electric conduction layer could be decided by using FWHM values of O 1s. We found that electric conduction layer is increasing according to the increase of the humidity in the atmosphere.

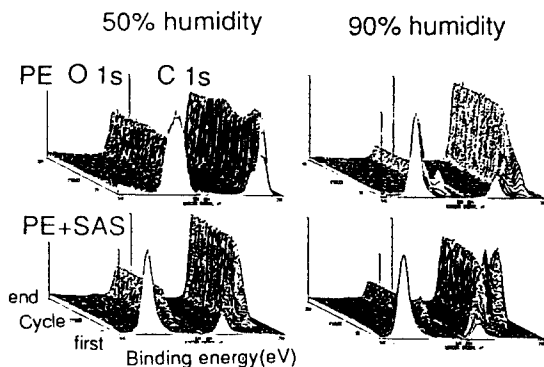


Fig.1 Change of O 1s and C 1s spectra during repeated XPS analysis.

C1s spectrum; (90% humidity PE+SAS) have three peaks. The right one shows the electric conduction layer.

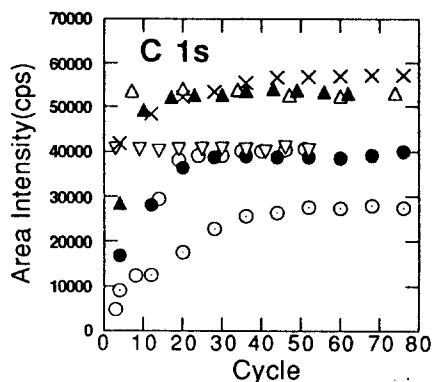


Fig.2 Carbon 1s intensity vs measurement cycle.

- 40% humidity(PE+SAS)
- 50% humidity(PE+SAS)
- 90% humidity(PE+SAS)
- △ 50% humidity(PE)
- ▲ 90% humidity(PE)
- ▽ non Ice(40% humidity)
- × Ion Etching(40% humidity)