

The initial stages of Al/Alq₃ interface formation: medium energy ion scattering measurements

Jung Han Lee¹, Dae Won Moon², Yeonjin Yi²

¹Korea University of Science and Technology, ²Korea Research Institute of Standards and Science

Organic electronic materials are considered promising material for various electronic devices in recent years. For example, organic light emitting devices are already matured to commercialize beyond the experimental stage. Most organic devices inevitably have the metal-organic contact to form the electrode. The interface between metal electrode and organic layer plays a crucial role in the performance of such devices.

Various researches on metal-organic interface have been performed and it is revealed that there are significant changes in electronic structure and chemical reactions at the interface. But these results focus on the electronic structure, so the physical structures of the interface is not clear. It is presumed that a part of metal diffuses into organic layer during depositing a metal electrode on the organic layer. However, there are no direct evidence or the direct analysis method to measure the metal diffusion into the organic layer.

We studied the behavior of Al when it is deposited on Alq₃ layer. We focused on the initial stage of the Al deposition on Alq₃. Medium energy ion scattering measurements were carried out, which allowed us to analyze the depth profile of each element with the depth resolution of about 1 nm. The Al sits beneath the Alq₃ sub-layer and some part of Al diffuses into Alq₃ layer more than 20 nm.