

Evaluation of water permeability in sealants by D-SIMS

The use of isotope-labeled water, D_2O , and D-SIMS enables us to clarify permeated D_2O profile after exposure in D_2O vapor. This method is promising for evaluating the water permeation behavior in organic films.

Evaluation of water permeability by D-SIMS

Dynamic SIMS (D-SIMS*) is able to provide

- depth profile of elements
- identification of isotopes
- high-sensitivity analysis
- small area
(from tens square um to hundreds square um)

(* : Secondary ion mass spectrometry)

An acceleration test using D_2O can provide the information of evaluating the water permeation behavior.

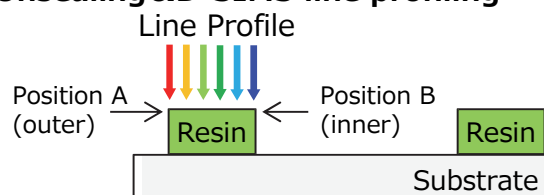
For inorganic capping layer of low diffusion rate, D-SIMS depth profiling of the layer is applicable.

For organic materials, resin etc., of high diffusion rate, we propose D-SIMS line profile analysis to evaluate long-distance diffusion (shown in the right figures).

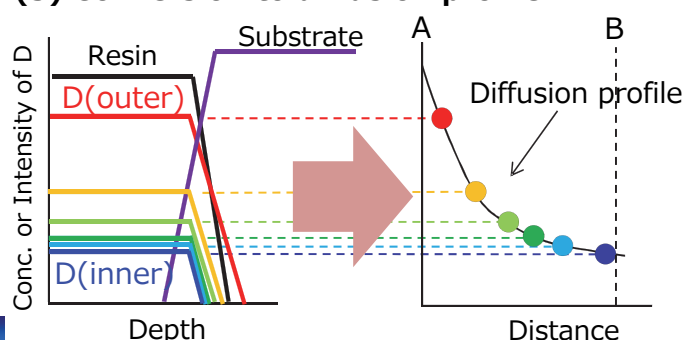
(1) D_2O humidification test



(2) Unsealing & D-SIMS line profiling

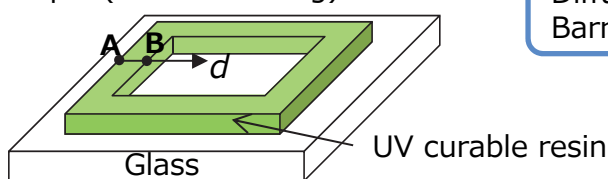


(3) Conversion to diffusion profile

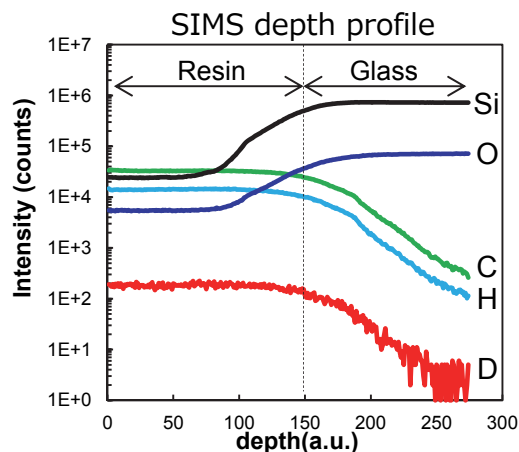


Water vapor barrier analysis of OLED sealants

Sample (after unsealing)



Diffusion of water (D_2O) to the inner side was observed. Barrier property shows the curing time dependence.



Diffusion profile of D (D_2O)

