

Characteristics of Parylene film deposited with a fast deposition rate

Jae-Hyun Lee and Hae-Jung Kim

Dept. of Creative Convergence Engineering, Hanbat National University, Daejeon, 305-719, Korea
Tel.:82-42-821-1970, E-mail: jhyunlee@hanbat.ac.kr

Parylene (poly(p-xylylene)) film has been widely applied for a conformal coating industry because the parylene film which is deposited by chemical vapor deposition process has no pin-hole or bubbles compared to the solution based polymer films. Recently, the parylene film have been applied in the organic light emitting diodes industry by various applications such as a thin flexible substrate, flattening layer on rough substrate or organic layers for thin film encapsulation. To fabricate the parylene film in a micro-scale thickness, however, deposition process of parylene needs long tack time due to the slow deposition rate of 10-30 nm/min.

In this study, we present the optical and physical characteristics of parylene films which are deposited by an ultra-fast deposition rate of 500 nm/min as shown in Fig. 1 (a). These parylene films show the optical properties of high transmittance over 90% in the visible range and low haze below than 5%. The root mean square surface roughness measured by atomic force microscopy are 8.6 nm and 8.7 nm for the parylene films which are deposited with a slow or fast deposition rate, respectively.

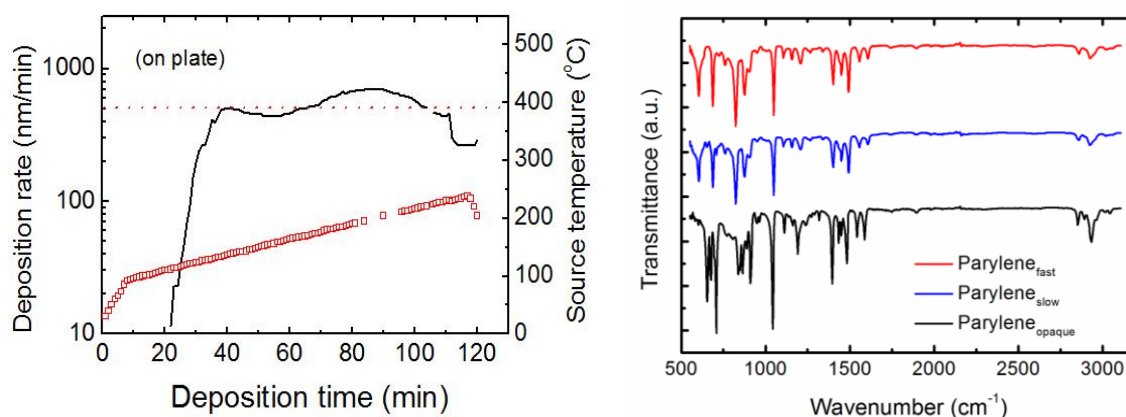


Fig. 1. (a) Deposition rate of parylene (b) FT-IR analysis result of parylene films

Various parylene films are analyzed by the FT-IR measurement as shown in Fig. 1 (b). Parylene film deposited with a fast process shows the same characteristics with the parylene film deposited with the normal process. This means that the polymerization process of parylene monomers was successfully achieved at the ultra-fast deposition rate. These results suggest the wider applications of parylene film to flexible electronics, transparent thin film encapsulation or biomimetic sensor area.

Acknowledgment

This work was supported by Business for Cooperative R&D between Industry, Academy, and Research Institute (Grants No.C0217363) funded Korea Small and Medium Business Administration in 2014.

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