

### Deposition control of parylene-A film with quartz crystal microbalance (QCM)

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The parylene-A is a polymer of p-xylene with primary amine groups, and it is polymerized by pyrolysis of the functionalized parylene dimer with primary amine groups. The functionalized parylene-A film was used for the biosensor applications to immobilize proteins, and it requires a quite thin film with a thickness less than 100 nm. The conventional methods to control the thickness of parylene films by 1) adjusting the amount of parylene dimer and 2) setting the deposition time were observed to result in a large deviation from the targeted thickness at the thickness range of 0 - 100 nm, and the film thickness from the repeated deposition under the same condition showed quite a poor reproducibility. In this work, an on-line monitoring method of parylene-A film thickness was presented by installing a quartz crystal microbalance (QCM) sensor at the deposition chamber. And then, the parylene-A films were prepared by using the on-line monitoring method based on the QCM sensor. From the comparison of control parameters such as the linearity as well as reproducibility with the conventional methods, the QCM monitoring was proved to be feasible for the deposition of a thin film with a thickness less than 100 nm.