

On-line control of parylene film deposition with quartz crystal microbalance (QCM)

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The parylene is a polymer of p-xylene and it polymerized by pyrolysis of parylene dimer called di-p-xylene. The parylene has been reported to have chemical-resistance, electric isolation, water-proof, transparency, and so on. Recently, we applied the modified parylene films for medical diagnostics. For such purposes, the thickness of parylene film required to be accurately and reproducibly controlled. Usually, the thickness control of parylene has been performed by the loading amount of the parylene dimer and the time taken for deposition. This work presents the quartz crystal microbalance (QCM) for the on-line monitoring of parylene thickness during the deposition process. The QCM sensor was installed at deposition chamber and the QCM signal was monitored during the whole deposition process. For the correlation of the resonance frequency shift of the QCM sensor, the thickness of parylene film was measured by using atomic force microscope (AFM). By comparison with the conventional methods by using the loaded amount of parylene dimers and the taken for deposition, the on-line QCM monitoring is determined to be feasible for the accurate and reproducible control of parylene thickness.