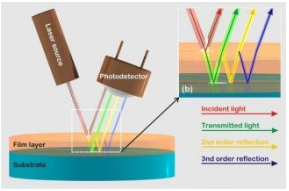
ThetaMetrisis APPLICATION NOTE #030

Thickness and refractive index determination of Parylene coatings on metal surface substrates.



Introduction: Parylene is the generic name for the poly-para-xylylenes. Parylene forms a protective plastic film (against acids, caustic solutions, dust, water vapor, etc.) when applied to substrate surfaces. Different types of parylene include C, N, D, HT, AF-4, and F. Each of them, has a specified utility distinguished by different chemical, electrical and physical properties. Depending on the specific use, parylene coatings can be effective in the range of 0.1 - 76 microns thickness. In this application note, we measure the thickness and the refractive index of Parylene coatings on metal substrates, using FR-Tools.

Means & Methods: Samples under investigation was three Parylene coatings (two Parylene C and one Parylene HT) on top of metal substrate, provided by Specialty Coating Systems[1]. Reflectance measurements performed using ThetaMetrisis FR-Basic UV/VIS, operating at the spectral range of 200-850nm.

Results: Typical experimental reflectance spectra (black line) and fitted reflectance spectra (red line), as recorded by the FR-Monitor software, of the parylene coatings, are illustrated in Figures below**.** Fitting was applied in 600-700 nm spectral range except for the thinner Parylene C in 400-850 nm spectral range. In case of Parylene C, thickness and refractive index found to be 30um and 1.62 respectively for the first one sample and 545.6 nm for the second Parylene C sample, while in case of Parylene HT, thickness and refractive index found to be 27.4um and 1.52 respectively.

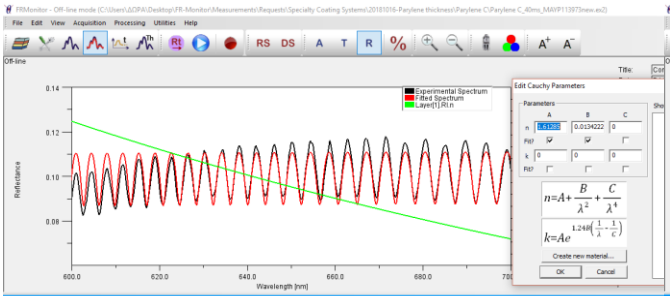


Figure 1): Specular Reflectance and refractive index calculation of **Parylene C** deposited on metal substrate as recorded by FR-Monitor. **Thickness measured at 30 um and Refractive Index at 1.62.**

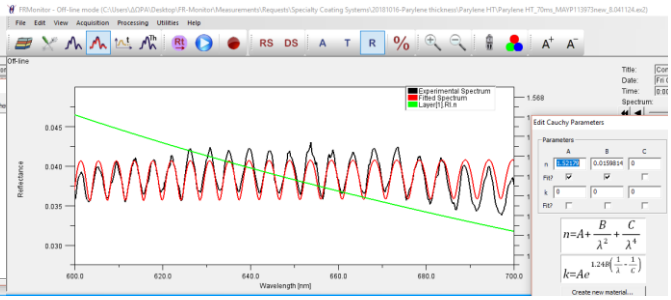


Figure 2): Specular Reflectance and refractive index calculation of **Parylene HT** deposited on metal substrate as recorded by FR-Monitor. **Thickness measured at 27.4 um and Refractive Index at 1.52.**

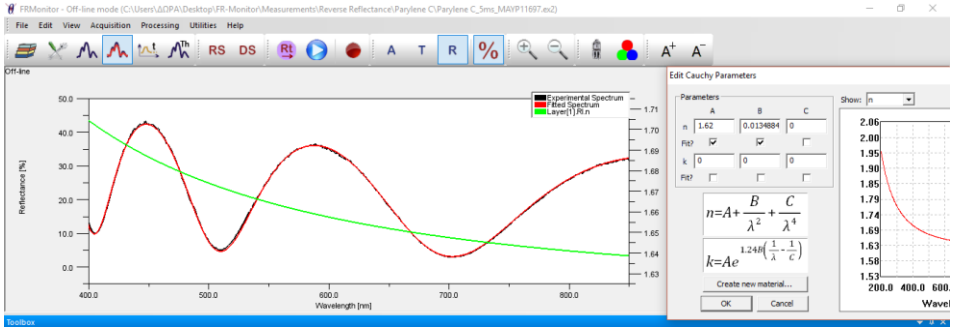


Figure 3): Specular Reflectance and refractive index calculation of thin **Parylene C layer** deposited on Si substrate as recorded by FR-Monitor**.**

Conclusions: The thickness of Parylene C and Parylene HT polymers on top of metal surfaces and Si and their refractive indices were successfully measured using FR-Tools.