

Film formation analysis with diffusing wave spectroscopy

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This work presents the use of Diffusing Wave Spectroscopy (DWS) for film analyses such as aeronautical coatings. The method is based on the study of backscattered light, which gives information about the mobility of particles. The higher the mobility, the more fluid is the sample. Mathematical data analysis, the technique allows to obtain typical drying kinetics of the coating as shown below. Two applications will be shown. Firstly, it will be discussed how different layers in aeronautical coating application can considerably increase the drying times. The number of layers spread on aircrafts have multiplied in recent years. In some cases the precoat retards the drying of the next layer, which leads to longer drying times. In this work, we will show how the DWS instrument Horus® can answer to this important issue. Secondly, a new approach of correlating characteristic drying times (open time) with the Persoz hardness. It was shown that the measured open time (around 10-60 min) of polyurethane/binder paints (2K) with different ratios of resin to binder correlate linearly with the corresponding Persoz hardness (measured at 180 hours). From a calibration line of (5 to 6 ratios) one can extrapolate the Persoz hardness by this technique with only 1 hour of measurement.