SIMULTANEOUS MONITORING OF DRYING VARNISH WITH NMR AND OCT

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Recent work has shown that the most important contribution to the optical appearance of varnishes on a paint surface is the ability of the varnish to give a smooth top surface. It has been shown that different types of resin have different surface levelling ability and it has been proposed that the ability of the resin molecules to flow with increasing concentration as it dries is responsible for the difference in appearance. Nuclear Magnetic Resonance (NMR) can be used to non-invasively measure the self diffusion coefficients in the drying varnish. The self diffusion coefficient of the resin directly tells us how fast the resin can flow as it dries. This technique can, therefore, tell us how "wet" the varnish is. Optical Coherence Tomography measures not only the changing thickness of the varnish, but also the large scale roughness of the surface of the varnish and how it relates to the surface profile beneath simultaneously. The combination of these techniques allows us for the first time to relate directly how wet the varnish is as it dries and potentially identify at which point different varnishes solidifies and how it correlates with surface roughness.