Dispersion Measurement for Material Identification

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Dispersion caused by the refractive index variation over a spectral range is an important characteristic to identify the structure and composition of materials. This presentation reports on work to obtain dispersion information spectral-domain optical coherence tomography. To process time-frequency analysis, a non-uniform Fourier transformation is applied to remove the resolved non-uniform frequency sampling. Analysis of the spectral phase function in the optical frequency domain is applied to measure the dispersion. This research experimented with water (H₂O) to measure dispersion. The measured dispersion of water is compared with known data to confirm the methodology. In addition, the concentration of a glucose solution was estimated by analyzing the spectral phase function. The result showed that this method can provide an ability to measure glucose concentration with highly sensitive up to 0.54 mM. In conclusion, this method can be implemented to monitor sample constituents and to compensate for material dispersion.