OPTICAL ACTIVITY TEMPERATURE-DEPENDENT MEASUREMENTS OF CHIRAL SOLUTIONS USING MUELLER MATRIX SPECTROSCOPIC ELLIPSOMETRY

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Optical activity measurements have been widely conducted using a simple chemical spectrometer with monochromatic source so far. This work introduces versatile and simple technique of optical activity measurements using Woollam RC2 spectroscopic ellipsometer with spectral range 0.73 to 7.1 eV (170 to 1700 nm). First, we present the measurements of chiral solutions under constant temperature, where the dependences of optical activity on solution concentration were determined. The measured spectra over visible region of light were compared to Mueller matrix theoretical model and specific rotatory powers of each chemical individua were calculated. Second, temperature-dependent measurements were conducted using homemade, specially designed temperature control cells with 0.5 °C accuracy. The correctness of the method was confirmed performing Lu-Chipman polar decomposition of according Mueller matrix and the calculated specific rotatory powers were compared to commonly tabulated data for 589 nm with good agreement, which proves us, that our method is well-performed and repeatable.