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Circular dichroism spectra measurement of amino acids using polarization modulation technique in VUV region

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Circular dichroism (CD) spectra of alanine (Ala) films and leucine (Leu) films in vacuum ultraviolet (VUV) region ($\lambda > 120$ nm) were measured at beamline BL-5 of the electron storage ring TERAS in AIST, Tukuba, Japan. In this beamline, four-period Onuki-type crossed undulator[1] was installed as light source. CD signals of L-Ala film were observed positive peak and that of D-Ala film were observed negative peak at around 160 nm and 180 nm. CD signals of L-Ala film were also observed negative peak and that of D-Ala film were observed positive peak at around 200 nm and $\lambda > 145$ nm. Absolute intensity of these peaks of L-Ala was almost equal to that of D-Ala. These peaks at around 180 nm and 200 nm were ascribed to the π - π^* resonance and n - π^* resonance of carboxyl group COO^- [2]. CD signal of L-Leu film was observed positive peak and that of D-Leu film was observed negative peak around 185 nm. CD signal of L-Leu film was observed negative peak and that of D-Leu film was observed positive peak around 165 nm. CD signal of L-Leu film was observed positive peak and that of D-Leu film was observed negative peak at $\lambda < 135$ nm. CD signals of Leu were not observed around 200 nm and $135 < \lambda < 155$ nm. It is interested difference of peak between Ala and Leu. So, theoretical calculations will be necessary. The g-factor (CD/Absorption) known to play an important role in origin of biomolecular homochirality at n - π^* resonance is 2-3 % and that at π - π^* resonance is 0.75 %. According to Kodama, g-factor of Leu films at 185nm was 1.1% and asymmetric photo-decomposition using Leu films induced by at 170 nm CPL irradiation was reported to be 1.5%. So, we expect that asymmetric photo-decomposition using Ala film is induced by at 180 nm and 200nm CPL irradiation.

Reference

[1] H. Onuki, *Nuclear Instruments and Methods in Physics Research A*246(1986)94

[2] T. Inagaki, *Biopolymers* 12 (1973) 1353