SPR measurements of nematic liquid crystal with water boundary

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Surface plasmon resonance (SPR) has been used in the fields of medicine and physiology as a high-sensitive antigen sensor using an antigen-antibody reaction. However, extraction of an antibody from a living body takes long time and costs much, so that a SPR sensor without an antigen-antibody reaction will be useful in those fields.

The 5CB was used in this study. The SPR of a gold thin film which was covered by samples, as shown in Fig. 1, was measured. The gold thin film was vapor-deposited on the glass substrate previously. A He-Ne laser with a wavelength of 632.8 nm was used for the light source and impinged to the Au film from the glass substrate side. The reflection light from the Au surface was measured by a photo-diode. The resonance angle of SPR was measured by changing the incident angle.

Fig. 2 shows the results for the samples, (a)air, (b)water, (c)LC in nematic phase and (d)LC in isotropic phase, respectively. Apparent resonance was measured at 41 degree in the result of the air. The resonance due to the air surface was disappeared and another resonance due to the water surface was appeared around 65 degree in the result of the water. Because the refractive index of 5CB is larger than water, SPR of 5CB must be observed at bigger incident angle and any resonance was not observed. However, different reflection property between the results of the nematic phase and the isotropic phase was observed at smaller angles. The reflection light intensity of LC with water boundary was also measured and will be discussed in detail.

References:

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