Sugimura *et al.* Reply: In their Comment[1] on the anomalous photoinduced current transients (APCT's) in nematic liquid crystals (NLC's), reported first by Sugimura *et al.*,[2] Ou-Yang, Liu, and Xie have proposed the photovoltaic effect arising from the nonlinear polarization of the NLC's under incident light as one possible explanation for the origin of APCT's. In Ref. 2, we propose that the pyroelectric effect in NLC's is responsible for APCT's and its effect would originate in the vicinity of the substrate surface because of the occurrence of dipole-dipole association and/or selective adsorption of the nematic molecules. In spite of our interpretation, however, we think that the explanation based on the photovoltaic effect offers a preliminary representation of our experimental results as follows.

In the Comment,[1] some characteristics of APCT's are explained by the model of the photovoltaic effect. The different spectrum sensitivity (Fig. 3 of Ref. 2) of the first-peak (anomalous current) and second-peak currents is also well explained by Eq. (3) of the Comment in that the magnitude of the second-peak current is τ_0/R_0C_e. Here, τ_0 is used to describe the photoelectric transformer characteristics. So, the spectrum of the second-peak current varies in correspondence to the absorption spectrum of 4-cyano-4'-5-alkyl-biphenyl (5CB), as in our observation. On the other hand, τ_0 does not appear in the magnitude of the first-peak current; therefore, the peak is independent of the wavelength, again in agreement with our observations. The open-circuit voltage is not observed by light illumination without applying a dc voltage to the NLC cell, because of APCT's originated by the field-induced effect. This property is indeed like the second-harmonic generation without the expected photovoltaic effect in the open circuit. Both cases might be based on the nonlinear properties of the NLC circuit. The explanation using the photovoltaic effect of nonlinear polarization differs from the general one using solely the different mobilities of the photoinduced negative and positive ions. This corresponds well to another of our experimental results,[3] which indicated no difference in the mobilities of the charge carriers with each sign. If the capacitance of the double layer near the electrodes C_0 is not neglected in Eq. (3) of the Comment, the result of the calculation will include the cusp portion.

In summary, the photovoltaic effect arising from the nonlinear polarization of the NLC under incident light is a useful interpretation for the APCT's. Further theoretical treatment will make the phenomena of the APCT's clear. On the other hand, if molecular association layers exist near the substrate surfaces, the pyroelectric effect must also be considered for the origin of the APCT's. In addition to our considerations, the APCT's would be explained by the model of the nonlinear circuit network and might relate to the membrane current in nerves and that of the photoelectric transformer in visual sense cells proposed by Hodgkin and Huxley.[4]

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