Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Model of photoinduced structural change induced by THz pulse irradiation KUNIO ISHIDA, Utsunomiya Univ, KEIICHIRO NASU, Institute of Materials Strucutre Science, KEK, Japan — Recently intense optical pulses with THz frequency have been obtained, and it is of interest to study the effect of irradiated THz pulses on electronic systems. We theoretically study the photoinduced cooperative dynamics triggered by irradiation of THz pulses. We employed a model of two-level localized electrons coupled with an optical phonon mode taking into account the nonadiabaticity of the electron dynamics, and solved the time-dependent Schrödinger equation numerically. We consider the cases in which the THz pulses create phonons near the surface of the system, and pursue the electronic transitions induced by the propagation of the phonons. We found that they are able to induce excited-state domain growth, and that the interference between them plays an important role in the growth dynamics. Hence, the domain growth is affected by the geometry of the surface of the system, which is different from the photoinduced structural change by visible/UV pulses. We also show that the nonadiabatic/adiabatic electronic transitions should be taken into account though the domain growth mainly proceeds on the ground-state potential energy surfaces(PESs). In other words, the energy level/structure of excited-state PESs are relevant to the domain-growth dynamics.

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Date submitted: 11 Nov 2016 Electronic form version 1.4