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Ultrafast phase transitions in (TMTTF)2AsF6 and alpha-(ET)2I3 driven by infrared 1.5 cycle CEP stabilized pulse SHINICHIRO IWAI, TAKAHIRO ISHIKAWA, TUTO SAGAE, HIROTAKE ITOH, Department of Physics, Tohoku University, KAORU YAMAMOTO, Departement of Applied Physics, Okayama University of Science, TAKAHIKO SASAKI, Institute for Materials Research, Tohoku University, TOHOKU UNIVERSITY TEAM, OKAYAMA UNIVERSITY OF SCIENCE TEAM, INSTITURE FOR MATERIALS RESEARCH TEAM — Recent progress of several 10 fs laser enables us to capture the coherent dynamics of the correlated electrons leading to the photoinduced phase transition. In this study, coherent 18 fs oscillations of the correlated CO electrons were captured in the 1D chain salts (TMTTF)2AsF6 and in layered organic salts alpha-(ET)2I3 by using the 1.5 optical-cycle (7 fs carrier envelope phase (CEP) stabilized) IR(1.7 micron) pulse. We observed the build up time of 50 fs for the coherent oscillation in CO and metallic phases. In CO phase, photoinduced CO melting is driven by the electron oscillation in (TMTTF)2AsF6. In the metallic phase of alpha-(ET)2I3, the coherent oscillation of the correlated charge triggers the metal to insulator transition which decays within 100 fs. Such ultrafast metal to insulator transtion can be detected only for the strong excitation condition.

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