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Temperature dependence of Photoinduced dynamics in the orbital-ordered state of $A\mathbf{V_{10}O_{15}}$ (A = Ba, Sr) AYAKA NOGAMI, YUYA ONISHI, KOU TAKUBO, TAKUROU KATSUFUJI, Dept. of Physics, Waseda University — In $AV_{10}O_{15}$ (A = Ba, Sr), the V ions with mixed-valence states, V^{2+}/V^{3+} ($3d^3/3d^2$), are located on the triangular lattice. $BaV_{10}O_{15}$ exhibits a structural phase transition with V trimerization caused by the orbital ordering of V ions at T_c = 123 K, whereas $SrV_{10}O_{15}$ does not exhibit such a phase transition. We performed a femtosecond pump-probe reflection spectroscopy on $BaV_{10}O_{15}$ and $SrV_{10}O_{15}$ to clarify their photoinduced dynamics. For A = Ba, a photoinduced melting of V trimerization, i.e. a photoinduced phase transition, was observed at 10 K ($< T_c$). At T = 200 K ($>> T_c$), the photoinduced reflectivity change ($\Delta R/R$) for A = Ba shows an oscillation with the period of several tens picoseconds, similarly to the behavior for A = Sr at 10 K. This oscillation can be explained by assuming that the photoinduced state at the sample surface propagates into the inside of the sample. At T = 135 K, immediately above T_c, we found that $|\Delta R/R|$ for $BaV_{10}O_{15}$ increases with time, suggesting that the area of the photoinduced state on the sample surface increases with time.

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