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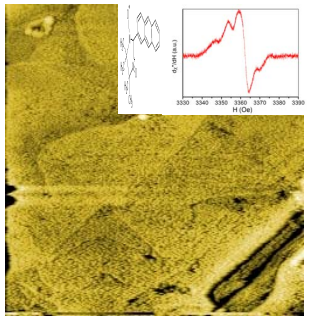

STM image of ordered arrays of NIT-anthracene phenantroline. The inset shows the NIT-anthracene molecular structure and the ESR image obtained from.

AR10

Ultrafast Phenomena of Charge-ordering Phase in $La_{1/4}Pr_{3/8}Ca_{3/8}MnO_3$

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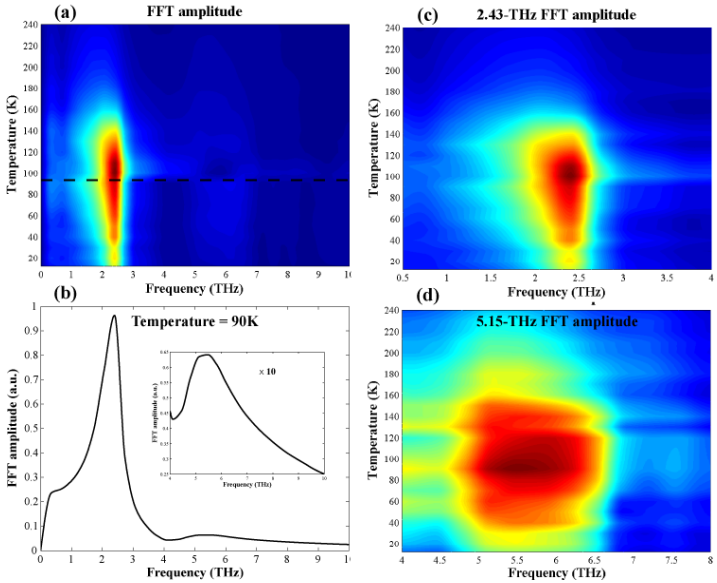

Fig. 1. The gereration of coherent optical phonons in $La_{1/4}Pr_{3/8}Ca_{3/8}MnO_3$ (a) Fourier- transform of coherent oscillations. (b) Two modes of coherent optical phonons appearing at 90 K (charge-ordering phase). (c), (d) Temperature dependence of optical phonon spectrum of 2.43 THz and 5.15- THz, respectively.

We have used 1.5 eV pump-and-probe spectroscopy to investigate the optical phonon modes of a phase-separated manganite, $La_{1/4}Pr_{3/8}Ca_{3/8}MnO_3$(LPCMO). LPCMO has the mixed-phase of ferromagnetic metal(FM) and charge-ordering insulator(CO) coexisting as submicrometer-sized domains[1]. Related with the domain size dynamics of the CO phase, we have obtained several temperature dependent phenomena such as coherent optical phonon generations (two modes), an acoustic phonon generation, and multiple time-scale relaxations involving electron, lattice, and spin carriers. Fig. 1 shows the temperature dependence of coherent optical phonon generations of 2.43- and 5.15-THz phonons. These optical phonon modes appear in conjunction with the charge-ordering phase below TCO. However, below TC (=110 K), the amplitudes of these phonons begin to fall with the increase of FM domain fraction [2]. These scaling behaviors indicate that the optical phonons are related with the CO phase only in these structural mixed-phases of LPCMO.

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