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Strong magnon-phonon coupling in NaFeAs studied by neutron scattering YU LI, Rice University, ZAHRA YAMANI, CNBC, YU SONG, CHENGLIN ZHANG, PENGCHENG DAI, Rice University — We carried on inelastic neutron scattering experiment on the triple axis spectrometer in CNBC in Chalk River. We measured both the phonon and magnon in NaFeAs single crystals and their temperature dependence. Since structural transition temperature (T_S) and the magnetic transition temperature (T_N) are well separated in NaFeAs, it provides us an unique chance to exclude the consequence of magnetic order and focus on the so called nematic phase. As the previous paper on BaFe₂As₂, we observed the strong phonon softening nearby the structural transition temperature at very small q ($q < 0.1$). This makes the phonon in NaFeAs deviate from the classical linear dispersion relationship for acoustic phonons. Besides the phonon softening, we also observe phonon hardening at a larger q range when the temperature goes down. This is accompanied by the stiffening of the magnons which can be represented by the linewidth of the low energy magnetic peaks. Our results suggest that there is strong coupling between the phonons and magnons in NaFeAs.

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